DOCUMENT RESUME

ED 091 239 SE 017 932

AUTHOR	Suydam, Marilyn N.; Weaver, J. F.
TITLE	Research on Mathematics Education (K-12) Reported in 1973.
INSTITUTION	ERIC Information Analysis Center for Science, Mathematics, and Environmental Education, Columbus, Ohio.
PUB DATE	Mar 74
NOTE	83p.
AVAILABLE FROM	Ohio State University, Center for Science and Mathematics Education, 244 Arps Hall, Columbus, Ohio 43210 ($1.75)
EDRS PRICE	MF-$0.75 HC-$4.20 PLUS POSTAGE
DESCRIPTORS	*Annotated Bibliographies; Bibliographies; *Elementary School Mathematics; Literature Reviews; Mathematics Education; *Research; *Research Reviews (Publications); *Secondary School Mathematics

ABSTRACT

This annotated bibliography lists research related to mathematics teaching and learning which was published in the United States during 1973. The listing covers the levels K-12, and is divided into three major sections. The first section lists research summaries which review groups of research studies. The second section contains research reports which appeared in journals during 1973. The final section includes dissertations announced in "Dissertation Abstracts International." (JP)

ED 091239

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RESEA
MATH
(K-12)

RESEARCH ON MATHEMATICS EDUCATION (K-12) REPORTED IN 1973

By Marilyn N. Suydam
J.F. Weaver

The ERIC Science, Mathematics and Environmental Education Clearinghouse and the Center for Science and Mathematics Education
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MATHEMATICS EDUCATION REPORTS

Research on Mathematics Education (K-12) Reported in 1973

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March 1974

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Preface

This annotated bibliography lists research related to mathematics teaching and learning which was published in the United States during 1973. The listing covers the levels from kindergarten through grade 12, and is divided into three major sections. The first section lists research summaries which review groups of research studies. The second section contains research reports which appeared in journals during 1973. The final section includes dissertations announced in Dissertation Abstracts International. (To conserve space, this reference is referred to as DAI in the listing.)

The ERIC Information Analysis Center for Science, Mathematics, and Environmental Education is pleased to make this annotated bibliography available as a Mathematics Education Report.

Jon L. Higgins
Associate Director for
Mathematics Education

This publication was prepared pursuant to a contract with the National Institute of Education, U. S. Department of Health, Education and Welfare. Contractors undertaking such projects under government sponsorship are encouraged to express freely their judgment in professional and technical matters. Points of view or opinions do not, therefore, necessarily represent official National Institute of Education position or policy.

Research Summaries

Articles which summarize research findings or list research reports are included in this section.

Aiken, Lewis R., Jr. Ability and Creativity in Mathematics. Review of Educational Research 43: 405-432; Fall 1973.

Studies related to types and factors of mathematical ability, the meaning and measurement of creativity, heredity and development in mathematical abilities, psychosocial factors, and education for mathematical creativity are reviewed.

Begle, E. G. Some Lessons Learned by SMSG. Mathematics Teacher 66: 207-214; March 1973.

Findings from SMSG research and development efforts are discussed, under the headings of objectives, teachers, curriculum, instructional processes, students, class size, cultural differences, student attitudes, and further observations.

Brousseau, Andre R. Mathematics Laboratories: Should We or Should We Not? School Science and Mathematics 73: 99-105; February 1973.

Research on the use of mathematics laboratories is reviewed; it is suggested that laboratories be considered one approach to be used to meet individual needs.

Connolly, Austin J. Research in Mathematics Education and the Mentally Retarded. Arithmetic Teacher 20: 491-497; October 1973.

Findings from research with mentally retarded children are discussed and instructional practices are suggested.

Heimer, Ralph T. and Lottes, John J. Toward a Theory of Sequencing: An Integrated Program of Research: The Theoretical Model and a Synopsis of the First Two Years of the Research Program. Journal for Research in Mathematics Education 4: 85-93; March 1973.

The rationale for the Paradigms Project is given, with an overview of the mode-of-representation, structure of curriculum hierarchy, and choice-behavior studies which have been conducted.

Knaupp, Jonathan. Are Children's Attitudes Toward Learning Arithmetic Really Important? School Science and Mathematics 73: 9-15; January 1973.

Research on attitudes is reviewed, with the conclusion that "there is general agreement that a child's attitude toward learning arithmetic is important, but measures of general attitude have not been found to be causally related to arithmetic achievement."

Knight, Carlton W., II. Doctoral Dissertation Research in Science and Mathematics Reported for Volume 31 of Dissertation Abstracts: Part II--Mathematics. School Science and Mathematics 73: 121-146; February 1973.

One hundred dissertations were classified as elementary; 48, junior high; 55, secondary; 84, college and adult; and 58, teacher education (some duplicate listing).

Suydam, Marilyn N. and Weaver, J. F. Research on Mathematics Education (K-12) Reported in 1972. Journal for Research in Mathematics Education 4: 205-242; November 1973.

This annual annotated listing includes 13 research summaries, 71 journal-published reports, and 335 dissertations.

White, Richard T. Research into Learning Hierarchies. Review of Educational Research 43: 361-375; Summer 1973.

Gagne's studies on hierarchies and several others (not all on mathematics) are reviewed; the weakness of the evidence is discussed and a more rigorous model is proposed.

Journal-Published Reports

Seventy-six articles which were published in 19 journals are listed.

Achenbach, Thomas M. Surprise and Memory as Indices of Concrete Operational Development. Psychological Reports 3: 47-57: August 1973.

Children were surprised at color change at lower MAs than they were surprised by quantitative change. Length and number conservation preceded quantity conservation for both normal and retarded children. (MA 6)

Bartel, Elaine V. Supervision in Mathematics. Arithmetic Teacher 20: 24-26; January 1973.

Scores of both teachers and instructor using a developed observation scale correlated highly with rank ordering of intuitive judgments. (elementary in-service)

Beamer, Robert H. and Lemke, Elmer A. Effects on Transfer of Training of Constant Versus Varied Training, Group Size, and Ability Level, in Elementary School Mathematics. Journal for Research in Mathematics Education 4: 20-25; January 1973.

Training individuals in five methods of doing multiplication with fractions facilitated transfer performance, as did training pairs with a single method. Conversely, training individuals in the single method inhibited performance, as did multiple-method training of pairs. (grade 5)

Beardslee, Edward C.; Gau, Gerald E.; and Heimer, Ralph T. Teaching for Generalization: An Array Approach to Equivalent Fractions. Arithmetic Teacher 20: 591-599; November 1973.

Procedures are presented from two research studies in which more than half of the students not only achieved mastery on the post-test of equivalent fractions but also passed a generalization test. (grades 5, 6)

Bergson, Richard O. Immediate Knowledge of Results and Test Performance. Journal of Educational Research 66: 224-226; January 1973.

No significant differences between groups having immediate or delayed knowledge of results were found in means on one-hour tests; on the final examination, differences significantly favored immediate reinforcement. (junior high, college)

Bowers, Robert Garth. Study 1-4: The Effect of Triangle-Pair Configuration Variation on Achievement of Selected Classes of Instructional Objectives in Plane Geometry. Journal for Research in Mathematics Education 4: 110-113; March 1973.

Transfer from single- and multi-configurations was found to occur. (grades 9, 10)

Brekke, Beverly W.; Williams, John D.; and Hariow, Steven D. Conservation and Reading Readiness. Journal of Genetic Psychology 123: 133-138; September 1973.

Conservers of number and substance scored significantly higher than non-conservers on a reading readiness test. (grade 1)

Brophy, Jere E. Stability of Teacher Effectiveness. American Educational Research Journal 10: 245-252; Summer 1973.

Teachers were more consistent in producing achievement gains within arithmetic and language arts than across them. Language arts tests correlated higher with arithmetic concepts and problem solving (which involve reading) than with computation. (teachers in grades 2, 3)

Brothers, Roy J. Arithmetic Computation: Achievement of Visually Handicapped Students in Public Schools. Exceptional Children 39: 575-576; April 1973.

No significant differences in computation achievement were found between students using braille or large type. Means for groups using various materials are given. (grades 4, 6, 8)

Brown, Ann L. Conservation of Number and Continuous Quantity in Normal, Bright, and Retarded Children. Child Development 44: 376-379; June 1973.

Retarded children performed on the conservation measures like normal children of the same mental age but less well than their normal chronological-age peers. Bright children did not perform as efficiently as their normal mental-age peers but more like their chronological-age peers. (age 6)

Callahan, Leroy G. and Robinson, Mary L. Task-Analysis Procedures in Mathematics Instruction of Achievers and Underachievers. School Science and Mathematics 73: 578-584; October 1973.

Task-analysis procedures were found to be effective for students' learning of a mathematical task. (grade 6)

Craig, Grace J.; Love, Jean A.; and Olim, Ellis G. Perceptual Judgments in Piaget's Conservation-of-Liquid Problem. Child Development 44: 372-375; June 1973.

A consistent pattern of matched-ratio predictions was found, rather than the expected even-level predictions. (ages 4-6)

Davis, Edward J. A Study of the Ability of School Pupils to Perceive and Identify the Plane Sections of Selected Solid Figures. Journal for Research in Mathematics Education 4: 132-140; May 1973.

Students in grades 8 and 10 consistently had significantly higher mean scores when selecting drawings for designated cross-sections than did sixth-grade pupils. Girls had lower scores than boys did, and low-ability students did less well than middle- or high-ability students. (grades 6, 8, 10)

DeVries, David L. and Edwards, Keith J. Learning Games and Student Teams: Their Effects on Classroom Process. American Educational Research Journal 10: 307-318; Fall 1973.

Using the game EQUATIONS and teams resulted in more peer-tutoring and other affective benefits. (grade 7)

Elsner, Priscilla Jo. Criterion Referenced Assessment and Its Classroom Uses as Viewed by Teachers. School Science and Mathematics 73: 730-734; December 1973.

Teachers generally thought criterion referenced assessment for mathematics was more helpful for instructional planning than was norm-referenced testing. (elementary in-service)

Evans, Franklin R. and Pike, Lewis W. The Effects of Instruction for Three Mathematics Item Formats. Journal of Educational Measurement 10: 257-272; Winter 1973.

Each of the three item formats was susceptible to the special instruction specifically directed toward it, with complex or novel formats more likely to be affected than the straightforward format. (grade 12)

Farris, Dan C. Study 1-2: An Exploration of Selected Relationships Among the Enactive, Iconic, and Symbolic Modes of Representation. Journal for Research in Mathematics Education 4: 104-105; March 1973.

Mastery of antecedent objectives apparently did not induce mastery of consequent objectives for which no explicit instruction was provided. Order of acquisition of antecedent objectives did not significantly affect the implicit mastery of the consequent objectives. (grade 5)

Gay, Lorraine R. Temporal Position of Reviews and Its Effect on the Retention of Mathematical Rules. Journal of Educational Psychology 64: 171-182; April 1973.

Groups having reviews retained significantly more than a group having no reviews. Time of review was not a significant factor when only one review was given; reviews after 1 and 7 days were better than reviews after 1 and 2 days. (grades 7, 8)

Greabell, Leon C., Jr. and Uprichard, A. Edward. Distar Mathematics Program and Two Communication Skills of Poor-Risk Kindergartners. Psychological Reports 33: 126; August 1973.

Data resulting from use of Distar materials with nine pupils are briefly presented. (kindergarten)

Groen, Guy J. and Poll, Margaret. Subtraction and the Solution of Open Sentence Problems. Journal of Experimental Child Psychology 16: 292-302; October 1973.

For open subtraction sentences of the form $x + __ = y$, a model which assumes that pupils increment or decrement depending on which is quickest was found to give the best account of success latencies. None of the three models evaluated gave an adequate account of latency data for sentences of the form $__ + x = y$. (ages 6-9)

Haney, Joanne H. and Hooper, Frank H. A Developmental Comparison of Social Class and Verbal Ability Influences on Piagetian Tasks. Journal of Genetic Psychology 122: 235-245; June 1973.

For the Piagetian tasks used (including some mathematics-related ones), no socioeconomic effects were found; verbal ability and age-grade level were significant on most of the tasks. (kindergarten-grade 4)

Hernandez, Norma G. A Model of Classroom Discourse for Use in Conducting Aptitude-Treatment Interaction Studies. Journal for Research in Mathematics Education 4: 161-169; May 1973.

The four teachers studied differed in the percent of discourse coded managerial, convergent, reinforcement, and questions. Memory was the most frequently coded inferred cognitive process; the semantic mode was the most frequently used. (teachers in grade 8)

Hess, Robert D. and Tenezakis, Maria D. Selected Findings from "The Computer as a Socializing Agent: Some Socioaffective Outcomes of CAI". AV Communication Review 3: 311-325; Fall 1973.

For both CAI students (who had used a remedial drill-and-practice program in basic arithmetic for one or two years) and non-CAI students, the computer had a more favorable image than the teacher, textbooks, and TV news. (grades 7-9)

Hirschbuhl, John J. Study 1-5: An Exploration of Selected Transitivity and Conjunctive Relationships Among the Enactive, Iconic, and Symbolic Modes of Representation. Journal for Research in Mathematics Education 4: 113-115; March 1973.

Fulfilling the antecedent requirements was apparently not enough to imply the respective consequent objective in most cases. (grade 4)

Hollos, Marida and Cowan, Philip A. Social Isolation and Cognitive Development: Logical Operations and Role-taking Abilities in Three Norwegian Social Settings. Child Development 44: 630-641; September 1973.

Language stimulation and schooling did not seem to play a major role in the development of logical operations (including classification and conservation of quantity and volume tests). (ages 7-9)

Holly, Keith A.; Purl, Mabel C.; Dawson, Judith A.; and Michael, William B. The Relationship of an Experimental Form of the Mathematics Self-Concept Scale to Cognitive and Noncognitive Variables for a Sample of Seventh-Grade Pupils in a Middle-Class Southern California Community. Educational and Psychological Measurement 33: 505-508; Summer 1973.

Significant correlations were found between scores on the developed scale and ten of 18 demographic-biographical, cognitive, and affective variables. (grade 7)

Hopkins, Layne V. Study 3-2: An Exploration of Transitivities Formulated from a Set of Piagetian-Derived Operations and Their Implications in Traversing Learning Hierarchies. Journal for Research in Mathematics Education 4: 121-123; March 1973.

Mastery attained as a result of explicit instruction on either a main objective or its inverse did not imply achievement on their related transfer object. (grade 5)

Hosford, Philip L. The Right to Figure. Contemporary Education 44: 262-266; April 1973.

Teachers selected basic skill objectives when asked to focus on essentials for both high-school and elementary-school programs. For talented students, preference was indicated for independent study which might focus on the meanings of computation. (secondary in-service)

Hostetler, Robert P. Study 2-1: An Exploration of the Effect of Selected Sequence Variables on Student Choice in the Use of Algorithms. Journal for Research in Mathematics Education 4: 115-118; March 1973.

The generality of an algorithm was apparently not considered important by fifth-graders when choosing between two algorithms for solving a problem. The preferred algorithm will probably be the one learned second. (grade 5)

Houtz, John C.; Moore, J. William; and Davis, J. Kent. Effects of Different Types of Positive and Negative Instances in Learning "Nondimensioned" Concepts. Journal of Educational Psychology 64: 206-211; April 1973.

Positive instances with no common irrelevant attributes and positive and negative instances lacking one common attribute resulted in better performance than other instances. (grades 7, 8)

Jerman, Max. Individualized Instruction in Problem Solving in Elementary School Mathematics. Journal for Research in Mathematics Education 4: 6-19; January 1973.

Students using a wanted-given approach or general problem-solving techniques did not score significantly higher than control groups when number of correct answers was the criterion, but did use a correct procedure significantly more often, especially with a wanted-given approach. (grade 5)

King, Irvin L. A Formative Development of an Elementary School Unit on Proof. Journal for Research in Mathematics Education 4: 57-63; January 1973.

The procedure for developing the materials (using the iterative curriculum development model) was presented. Sixth graders were able to understand the theorems and learn the proofs. (grade 6)

Klein, Alice E. Adopting a Textbook, or: Research Can Help! School Science and Mathematics 73: 743-746; December 1973.

Five textbook series being considered for adoption were used in 10 classes per grade level; achievement data and teachers' evaluations were used to narrow the choice to two series. (grades 1-6)

Klein, Paul A. Study 1-1: An Exploration of Selected Relationships Among the Enactive, Iconic, and Symbolic Modes of Representation. Journal for Research in Mathematics Education 4: 94-103; March 1973.

It was concluded that if explicit instruction is provided on one of two paired objectives, then achievement on the other can be expected. (grade 5)

Kratzer, Richard O. and Willoughby, Stephen S. A Comparison of Initially Teaching Division Employing the Distributive and Greenwood Algorithms with the Aid of a Manipulative Material. Journal for Research in Mathematics Education 4: 197-204; November 1973.

Significant differences were found favoring the groups taught a partition approach to the standard division algorithm over the subtractive approach to the Greenwood algorithm, for total score and unfamiliar computational problems. (grade 4)

Kulm, Gerald. Sources of Reading Difficulty in Elementary Algebra Textbooks. Mathematics Teacher 66: 649-652; November 1973.

The percentage of mathematical symbols ranked as the best predictor of both explanatory and illustrative passages. Three of the four best predictors were the same for both types of material. (grade 9)

Kurtz, Ray. Fourth-grade Division: How Much is Retained in Grade Five. Arithmetic Teacher 20: 65-71; January 1973.

On a 16-item test, pupils on the average were able to work two less problems at the beginning of fifth grade than they could work at the end of fourth grade. (grades 4, 5)

Lester, Barry M. and Klein, Robert E. The Effect of Stimulus Familiarity on the Conservation Performance of Rural Guatemalan Children. Journal of Social Psychology 90: 197-205; August 1973.

Performance on conservation of area tasks was superior at both age levels to performance on conservation of quantity and matter, perhaps as a function of stimulus familiarity. (ages 5, 7)

Lilge, A. A. A Description of a Group-Learning Experience. Arithmetic Teacher 20: 51-55; January 1973.

A mathematics course in which students worked in groups under group leaders resulted in better-than-expected achievement. (elementary pre-service)

Long, Thomas E. and Herr, Edwin L. Teacher Perceptions of Basic Mathematics Skill Needs in Secondary Vocational Education. Mathematics Teacher 66: 61-66; January 1973.

Skills needed by vocational students, skills lacked by students, and skills needing remedial attention were listed as they were ranked by teachers. (secondary in-service)

Melnick, Gerald I. A Mechanism for Transition of Concrete to Abstract Cognitive Processes. Child Development 44: 599-605; September 1973.

Both normal and EMR children in the transitional stage conserved number at a low level of stimulus intensity but failed to conserve at a higher level of intensity. (kindergarten, grade 1, EMRs)

Mendels, Glen E. and Flanders, James P. Teachers' Expectations and Pupil Performance. American Educational Research Journal 10: 203-212; Summer 1973.

Although pupils whose teachers were told that they had academic potential tended to make greater gain scores, no significant differences were found in arithmetic grade and other measures. (grade 1)

Miller, Patricia H. Attention to Stimulus Dimensions in the Conservation of Liquid Quantity. Child Development 44: 129-136; March 1973.

Kindergarten conservers and non-conservers attended to height most frequently; minimal attention was given to width or quantity. Third-grade conservers attended to quantity more often. (kindergarten-grade 3)

Miller, Scott A. Contradiction, Surprise, and Cognitive Change: The Effects of Disconfirmation of Belief on Conservers and Nonconservers. Journal of Experimental Child Psychology 15: 47-62; February 1973.

Observable surprise at violations of expectancies concerning conservation of weight was infrequent in all groups. Changes in conservation judgment were frequent. (grades 2, 3, 5)

Montgomery, Mary E. The Interaction of Three Levels of Aptitude Determined by a Teach-Test Procedure with Two Treatments Related to Area. Journal for Research in Mathematics Education 4: 271-278; November 1973.

No significant interactions were found between aptitude and treatment (area or unit-of-area approach to unit-of-length concepts). Significant main effects were found favoring the higher aptitude level and the treatment emphasizing the unit. (grades 2, 3)

Moody, William B.; Bausell, R. Barker; and Jenkins, Joseph R. The Effect of Class Size on the Learning of Mathematics: A Parametric Study with Fourth-Grade Students. Journal for Research in Mathematics Education 4: 170-176; May 1973.

Pupils in classes of 1, 2, or 5 students displayed significantly greater attainment on an exponential unit than did pupils in a class of 23. One-to-one instruction was significantly superior to one-to-5 instruction. (grade 4)

Nadel, C. and Schoppe, A. Conservation of Mass, Weight, and Volume as Evidenced by Adolescent Girls in Eighth Grade. Journal of Genetic Psychology 122: 309-313; June 1973.

Less than one-third of the girls had attained "the conception of conservation of volume". (grade 8)

Naylor, Frank D. and Gaudry, Eric. The Relationship of Adjustment, Anxiety, and Intelligence to Mathematics Performance. Journal of Educational Research 66: 413-417; May-June 1973.

A measure of adjustment derived from semantic differential self-concept responses was significantly related to mathematics performance after the effects of anxiety and intelligence were partialled out. (grade 7)

Olander, Herbert T. and Robertson, Howard C. The Effectiveness of Discovery and Expository Methods in the Teaching of Fourth-Grade Mathematics. Journal for Research in Mathematics Education 4: 33-44; January 1973.

Classes having expository teaching achieved significantly better in computation; classes in another school having discovery teaching scored significantly better on the retention test of applications. Attitude improved more for those taught by the discovery method. Some interaction effects were also found. (grade 4)

Page, H. W. Concepts of Length and Distance in a Study of Zulu Youths. Journal of Social Psychology 90: 9-16; June 1973.

Data suggested that Zulu youths who grow up in town and attend school from an early age proceed to a Euclidean concept of space, while others are likely to retain topological ideas usually associated with much younger groups. (ages 11-26)

Paquette, Gerard A. Study 1-3: An In-Depth Exploration of the Role of Iconic Representations in the Study of Congruence of Triangles. Journal for Research in Mathematics Education 4: 105-110; March 1973.

Transfer without explicit instruction was found in many instances. (grades 9, 10)

Paris, Scott G. Comprehension of Language Connectives and Propositional Logical Relationships. Journal of Experimental Child Psychology 16: 278-291; October 1973.

Conjunctive expressions were readily understood by young children, but understanding of disjunction and implication relationships was relatively poor until middle adolescence. (grades 2, 5, 8, 11)

Peterson, John C.; Thomas, H. Laverne; Lovett, C. J.; and Bright, George W. The Effect of Organizers and Knowledge of Behavioral Objectives on Learning a Mathematical Concept. Journal for Research in Mathematics Education 4: 76-84; March 1973.

In only one instance (in three independent replications) was a significant interaction found between advanced and post organizers. (grade 8, elementary pre-service)

Phillips, E. Ray and Kane, Robert B. Validating Learning Hierarchies for Sequencing Mathematical Tasks in Elementary School Mathematics. Journal for Research in Mathematics Education 4: 141-151; May 1973.

An 11-level hierarchy for rational-number addition was constructed and tested; pass-fail relationships were analyzed using various validation processes. In a subsequent study, no procedure was found to be consistently superior, though efficiency of learning can be affected by sequence manipulation. (grade 4)

Phillips, Robert B., Jr. Teacher Attitude as Related to Student Attitude and Achievement in Elementary School Mathematics. School Science and Mathematics 73: 501-507; June 1973.

Most-recent-teacher-attitude toward arithmetic was found to be significantly related to student attitude toward arithmetic, but not significantly related to student achievement in arithmetic. Type-of-teacher-attitude for two or three of the past three years was significantly related both to student attitude and achievement. (grade 7, teachers in grades 4-6)

Pufall, Peter B.; Shaw, Robert E.; and Svrdal-Lasky, Ann. Development of Number Conservation: An Examination of Some Predictions from Piaget's Stage Analysis and Equilibration Model. Child Development 44: 421-427; March 1973.

Tasks where number and length covaried were easier than those where they did not covary. Some results, such as the use of one-to-one correspondence, did not agree with Piaget's predictions. (ages 4-5)

Romberg, Thomas A. and Shepler, Jack. Retention of Probability Concepts: A Pilot Study into the Effects of Mastery Learning with Sixth-Grade Students. Journal for Research in Mathematics Education 4: 26-32; January 1973.

The correlation between achievement scores immediately after learning and scores obtained four weeks later was .78. (grade 6)

Romberg, Thomas A. and Wilson, James W. The Effect of an Advance Organizer, Cognitive Set, and Post Organizer on the Learning and Retention of Written Materials. Journal for Research in Mathematics Education 4: 68-76; March 1973.

Providing a cognitive set was found to be facilitating, and either an advance or a post organizer was facilitating, but not both used together. (grade 11)

Rosner, Jerome. Language Arts and Arithmetic Achievement, and Specifically Related Perceptual Skills. American Educational Research Journal 10: 59-68; Winter 1973.

Significant relationships were found between reading achievement and auditory perception, and between arithmetic achievement and visual perception. (grades 1, 2)

Sawada, Daiyo. Study 3-1: An Assessment of a Selected Set of Piagetian-Derived Operators for the Generation of Effective Learning Hierarchies. Journal for Research in Mathematics Education 4: 118-121; March 1973.

The research design and questions were presented, but no results were reported. (elementary)

Schall, William E. Comparing Mental Arithmetic Modes of Presentation in Elementary School Mathematics. School Science and Mathematics 73: 359-366; May 1973.

Short, frequent exercises in mental computation resulted in more favorable attitude scores, though no significant differences in achievement were found. (grade 5)

Schmalz, Rosemary. Categorization of Questions That Mathematics Teachers Ask. Mathematics Teacher 66: 619-626; November 1973.

An instrument to be used in categorizing questions of teachers is presented.

Schnur, James O. and Callahan, Leroy G. Knowledge of Certain Geometric Concepts Possessed by Students on Leaving Elementary School. School Science and Mathematics 73: 471-478; June 1973.

Geometric concept areas were classified into seven levels of difficulty. (grade 6)

Scott, Ralph. Home Start: Family-Centered Preschool Enrichment for Black and White Children. Psychology in the Schools 10: 140-146; April 1973.

Black children did not appear to profit from a single year of prekindergarten activities involving seriation and classification, but did benefit from a program extending from ages 2 to 5. White children profited from both programs. (ages 4-6)

Sheppard, John L. Conservation of Part and Whole in the Acquisition of Class Inclusion. Child Development 44: 380-383; June 1973.

Children given training on class inclusion improved significantly while the control group did not change. Scores increased from first to second posttest. (age 6)

Sherrill, James M. Pre-Service Mathematics Education: What Is Required and What Elementary School Teachers Feel Should Be Required. School Science and Mathematics 73: 224-228; March 1973.

Teachers felt that pre-service programs should include two content and two methods courses. The amount of time a teacher spent in teaching mathematics seems to reflect how she felt about her mathematics courses. (elementary in-service)

Sherrill, James M. The Effects of Different Presentations of Mathematical Word Problems Upon the Achievement of Tenth Grade Students. School Science and Mathematics 73: 277-282; April 1973.

Students having problems with accurate pictorial representations scored significantly higher than students having no diagrams, who in turn scored significantly higher than those having distorted diagrams. (grade 10)

Silverblank, Francine. A Selection of Selected Personality Factors Between Students Talented in English and Students Talented in Mathematics. California Journal of Educational Research 24: 61-65; March 1973.

Boys talented in mathematics or English did not differ in levels of responsibility or mean levels of anxiety. Those talented in English were considerably more sociable than boys talented in mathematics. (grade 12)

Smith, Ian D. Impact of Computer-Assisted Instruction on Student Attitudes. Journal of Educational Psychology 64: 366-372; June 1973.

Attitudes in the non-CAI group were stable from pre- to posttest, while the CAI students (using a drill-and-practice arithmetic program) had considerably less stable attitudes. (grades 7-9)

Smith, Robert F. Diagnosis of Pupil Performance on Place-Value Tasks. Arithmetic Teacher 20: 403-408; May 1973.

A mastery test and five diagnostic tests (r = .53 to .93) were developed; five difficult skills were noted for low and high achievers. (grade 2)

Szetela, Walter. The Effects of Test Anxiety and Success/Failure on Mathematics Performance in Grade Eight. Journal for Research in Mathematics Education 4: 152-160; May 1973.

Effects of success/failure on measures of mathematics test anxiety and performance were not significant. Test anxiety was found to be a marginally significant factor in mathematics learning. (grade 8)

Wang, Margaret C. Psychometric Studies in the Validation of an Early Learning Curriculum. Child Development 44: 54-60; March 1973.

Methodological issues in validating branching hierarchies were discussed, with the use of validated hierarchies in constructing criterion-referenced placement and diagnostic test batteries considered. (pre-kindergarten-grade 1)

Weaver, J. Fred. The Symmetric Property of the Equality Relation and Young Children's Ability to Solve Open Addition and Subtraction Sentences. Journal for Research in Mathematics Education 4: 45-56; January 1973.

Performance on addition and subtraction sentences appeared to be related to grade level, operation, the position of the placeholder, and the existence or nonexistence of a solution within the set of whole numbers. Interactions were found between certain of these factors and open-sentence form. (grades 1-3)

Weaver, J. Fred. Pupil Performance on Examples Involving Selected Variations of the Distributive Idea. Arithmetic Teacher 20: 697-704; December 1973.

At all grade levels 4 through 7, pupils exhibited very little sensitivity to use of distributivity in solving examples varied in context, form, format, and number. (grades 4-7)

Wiles, Clyde A.; Romberg, Thomas A.; and Moser, James M. The Relative Effectiveness of Two Different Instructional Sequences Designed to Teach the Addition and Subtraction Algorithms. Journal for Research in Mathematics Education 4: 251-262; November 1973.

No significant differencesin overall performance were found between groups taught addition and subtraction of two-digit numbers as a single process or sequentially. Some differences in performance on operations significantly favored the sequential group. (grade 2)

Wozencraft, Marian. Correlations Among Stanford Achievement Test Scores, Intelligence, and Age by Level of Intelligence in Grades 3 and 6. Psychological Reports 33: 235-238; August 1973.

Changes in correlations of arithmetic and six other scores are noted. (grades 3, 6)

Dissertation Abstracts

The 295 dissertations listed in the following section were completed at 87 institutions.

Abate, Charles Edwin. An Evaluation of Individualized Educational System in an Elementary School. (Columbia University, 1972.) DAI 33A: 4234; February 1973.

In grades 1-3, but not in grade 4, pupils using the PLAN system achieved as well on a mathematics test as did students in a non-PLAN school. (grades 1-4)

Abshire, Myrtis Jane. A Study of the Preservice Education, Inservice Education, and Problems and Needs Identified by Elementary School Teachers of Mathematics. (McNeese State University, 1973.) DAI 34A: 3196; December 1973.

Only one-third of the teachers had had a graduate mathematics content course and only one-fourth had had a graduate mathematics methods course. Other information on background and needs was cited. (elementary in-service)

Adhikary, Poorna Kanta. Instructional Effect on Question Asking Behavior of Prospective Peace Corps Science and Mathematics Volunteer Teachers. (Indiana University, 1972.) DAI 33A: 4993; March 1973.

Students who received instruction on questioning techniques asked more convergent, divergent, and evaluative questions and fewer cognitive-memory and managerial questions. (secondary preservice)

Albers, Dallas Frederick. An Investigation of the Effects of the Allocation of Class Time on Pupil Achievement and Scheduling Preferences. (University of Missouri-Columbia, 1972.) DAI 33A: 4700; March 1973.

No significant difference in achievement was found between classes having geometry for 90 periods of 110 minutes or 180 periods of 55 minutes. They preferred the double period. (grade 10)

Albig, David L. A Study of the Effects of Verbalization on Concept Formation in Mathematics. (The Florida State University, 1973.) DAI 34A: 632; August 1973.

The hypothesis that requiring a student to verbalize a newly discovered mathematical concept interferes with his ability to use that concept was not confirmed. (elementary pre-service)

Al-Hadad, Sabah. Mathematical Art, An Approach to Developing Aids for Teaching Mathematics. (Arizona State University, 1972.) DAI 33A: 3938; February 1973.

A collection of 30 items of mathematical art was considered to have some potential for use as a teaching aid. (secondary, college)

Allen, Bruce Arthur. An Assessment of Comprehension of Certain Rational Number Equivalence Classes. (Boston University School of Education, 1973.) DAI 34A: 1575; October 1973.

A significant difference was found in pupils' ability to classify five fractions by lengths, continuous and discontinuous regions, sets, and numeration; either type of region was more difficult for them to use. (grades 3-6)

Amendola, Anthony A. Changes in Attitude and Achievement Effected by a Continuous Progress Education Program at the Elementary School Level. (Arizona State University, 1973.) DAI 33A: 4702; March 1973.

The continuous-progress program was as effective as a traditional program for increasing arithmetic-concepts knowledge but not computational skills. (grades 1, 3-8)

Ammon, Richard Irvin, Jr. An Analysis of Oral and Written Responses in Developing Mathematical Problems Through Pictorial and Written Stimuli. (The Pennsylvania State University, 1972.) DAI 34A: 1056-1057; September 1973.

Pictures elicited more ideas and more fluency in problems than did written stimuli. (grades 4, 5)

Appel, Ida J. The Relationship Between the Sequence of Graph Interpretation Skills and the Sequence of Mathematics Skills for Kindergarten Through Ninth Grade. (Fordham University, 1973.) DAI 34A: 116; July 1973.

A curriculum sequence was developed in which graph skills were matched with related mathematics skills. (kindergarten-grade 9)

Arrants, Glen Clyburn. An Individually Prescribed Instructional Program Using Behavioral Objectives with Primary Educable Mentally Retarded Children. (Duke University, 1972.) DAI 33A: 4973; March 1973.

Mean gain scores on an arithmetic test were significantly higher for EMR pupils when they used the developed IPI program. (primary EMRs)

Arulsigamoni, A. The Relationship Between Self-Concept and School Achievement in Low-Achieving, Junior High School Children and the Effect of Counseling Intervention on Self-Concept. (The American University, 1972.) DAI 34A: 187-188; July 1973.

No significant difference was found between levels of self-concept and mathematics achievement. (grades 7, 9)

Atkinson, Thomas Page. The Effect of Surface and Modality Upon the Identification of Geometric Shapes. (University of Oregon, 1972.) DAI 33A: 4783; March 1973.

Support was indicated for Piaget's contention that topological aspects precede Euclidean aspects in the development of spatial concepts. (ages 4-5 1/2)

Austin, Gary Francis. Knowledge of Selected Concepts Attained by the Deaf Adolescent Population. (Northwestern University, 1973.) DAI 34A: 3186; December 1973.

Deaf students developed selected concepts of money, measurement, and other non-mathematical topics differently than did hearing students, with knowledge increasing as a function of age in both groups. (ages 10-20)

Backman, Margaret Esther. Relationships of Ethnicity, Socioeconomic Status, and Sex to Patterns of Mental Abilities. (Columbia University, 1970.) DAI 33B: 4988; April 1973.

Girls performed better on language, perceptual, and memory factors, while boys were better on mathematics, visual reasoning, and verbal knowledge factors. (grade 12)

Bailey, James Melton. A Comparison of Two Approaches Designed to Improve the Computational Skills of Pupils in Grades Five and Seven. (North Texas State University, 1973.) DAI 34A: 1576; October 1973.

A programmed-material device was effective in improving computational skills in grade 5 but not grade 7; mental computation materials were not effective at either level. (grades 5, 7)

Ball, Linda Virginia. Student Contracting for Achievement Grades in Ninth Grade General Mathematics. (The University of Connecticut, 1973.) DAI 34A: 206; July 1973.

No significant differences in achievement or attitude were found between classes having or not having individual contracts. (grade 9)

Bargmann, Theodore John. An Investigation of Elementary School Grade Levels Appropriate for Teaching the Metric System. (Northwestern University, 1973.) DAI 34A: 3174; December 1973.

A teaching unit on the metric system was developed and taught to ascertain the appropriate grade level at which to teach specified content. (grades 3-6)

Barnard, James Allan. A Comparison of Two Approaches of Understanding Integer Addition by Prospective Elementary Teachers at Oregon College of Education. (University of Illinois at Urbana-Champaign, 1972.) DAI 33A: 5593; April 1973.

Students having a property approach to integer addition appeared to have better understanding immediately after instruction, while students having a theorem approach surpassed them after a retention period. (elementary pre-service)

Bazik, A. Matthew. Evaluation of a Plan for Individualizing Instruction Through Informing Students of Behavioral Objectives in a Mathematics Course for Prospective Elementary School Teachers at Elmhurst College. (Northwestern University, 1972.) DAI 33A: 5594; April 1973.

No significant differences were found between students who used self-paced materials with explicit objectives and a smaller group having traditional instruction. (elementary pre-service)

Beal, Jackie Lee. An Evaluation of Activity Oriented Materials Developed to Help the Low Achiever Attain Basic Mathematical Competencies. (The University of Nebraska, 1972.) DAI 33A: 3249-3250; January 1973.

Some differences in achievement and attitude favoring classes using various units for low achievers were found. (grades 7-9, 12)

Beardslee, Edward Clarke. Toward a Theory of Sequencing: Study 1-7: An Exploration of the Effect of Instructional Sequences Involving Enactive and Iconic Embodiments on the Ability to Generalize. (The Pennsylvania State University, 1972.) DAI 33A: 6721; June 1973.

Instruction using one, two, or three concrete embodiments of the concept of equivalent fractions had essentially the same effect on ability to generalize the concept. (grades 5, 6)

Beebe, Jewels Daniel. Self Concept and Achievement Among Elementary Students in an Experimental Program. (The University of North Dakota, 1972.) DAI 33A: 6580-6581; June 1973.

A significant difference in arithmetic achievement between initial testing and retesting was found only in grade 3. (grades 3-8)

Bernard, Richard Paul. The Historical Development of the Laboratory Approach to Elementary School Mathematics. (Indiana University, 1972.) DAI 33A: 5028; March 1973.

Between 1966 and 1971, the laboratory approach was used, discussed, and advocated more than at any previous time. The need for research was noted. (elementary)

Blaeuer, David Allan. Gifted College and Secondary Mathematics Students--Process Oriented Case Studies of Creativity. (State University of New York at Buffalo, 1973.) DAI 34A: 2454; November 1973.

Characteristics of students nominated as potentially creative were determined in terms of those who were "high creative" and those who were "low creative". (secondary, college)

Boersig, Teresa Marie. The Effects of Instruction in the Enactive Mode of Representation on Multivariable Verbal Problems Encountered in Elementary Algebra. (Purdue University, 1973.) DAI 34A: 3230; December 1973.

Students receiving instruction on coin, mixture, and uniform motion problems through programmed materials using only iconic and symbolic representations did not derive algebraic equations significantly better than those taught via videotape and programmed materials using enactive as well as the other modes of representation. (grade 9)

Boyd, Alvin Lyle. Computer Aided Mathematics Instruction for Low-Achieving Students. (University of Illinois at Urbana-Champaign, 1972.) DAI 34A: 553; August 1973.

No significant differences in achievement were found between groups who used or did not use computer programming. The non-computer group scored significantly higher on three of four attitude measures. (secondary)

Bradford, Equilla Forrest. A Comparison of Two Methods of Teaching in the Elementary School as Related to Achievement in Reading, Mathematics, and Self-Concept of Children. (Michigan State University, 1972.) DAI 33A: 4786; March 1973.

Gains in mathematics scores were significantly greater in the school using the Individually Guided Instruction Program. (elementary)

Brandt, John Henry, Jr. The Effects on Mathematics Achievement of Three Different Practice Amounts with Elementary Children in Selected Title I Schools. (The University of Oklahoma, 1973.) DAI 34A: 1687; October 1973.

No significant differences in achievement were found between groups given varying amounts of drill. (elementary)

Braxton, Loretta Murray. The Effects of Instruction in Sentential Logic on the Growth of the Logical Thinking Abilities of Junior High School Students. (University of Virginia, 1973.) DAI 34A: 657-658; August 1973.

Groups having instruction on logic achieved significantly higher than groups not having such instruction. The order of difficulty of logical patterns was determined. (grades 7-9)

Brender, Cecilia Colette. The Application of Diagnostic Teaching and a Mathematic [sic] Laboratory to a Middle School Individualized Unit on Fractions. (University of Pittsburgh, 1973.) DAI 34A: 1579; October 1973.

An individualized unit on fractions, which incorporated diagnostic teaching and a mathematics laboratory, increased achievement, though students did not meet criterion. (elementary)

Brown, Claude Kenneth. A Study of Four Approaches to Teaching Equivalent Fractions to Fourth-Grade Pupils. (University of California, Los Angeles, 1972.) DAI 33A: 5465; April 1973.

The use of a film and/or manipulative materials with the textbook resulted in higher achievement than use of the textbook alone. (grade 4)

Brunner, Joseph Francis. An Evaluation of an Academic Design to Upgrade the Achievement Scores of Children in the Washington D. C. Public Schools. (University of Massachusetts, 1972.) DAI 33A: 4996; March 1973.

Total arithmetic scores were at "expected" (norm group) levels. The most critical growth period appeared to be between grades 3 and 5. (grades 2-7)

Brush, Lorelei Ruth. Children's Conceptions of Addition and Subtraction: The Relation of Formal and Informal Notions. (Cornell University, 1972.) DAI 33B: 4989; April 1973.

Variability as well as patterns of use of number were noted. (ages 4-6)

Bumby, Douglas Robert. The Effects of Modifying Explanatory and Illustrative Material in a Seventh Grade Experimental Mathematics Textbook. (Columbia University, 1973.) DAI 34A: 2907; December 1973.

Revised explanatory passages and one of two revised illustrative passages resulted in better comprehension. Readability of the revised versions (from SSMCIS) was significantly better than for the original. (grade 7)

Bunch, Martha Anne. A Study of the Effects on Retention and on the Problem-Solving Ability of Students When Geometry Is Used as an Aid in Teaching Factoring of Second-Degree Polynomials. (University of Missouri-Kansas City, 1972.) DAI 34A: 1057-1058; September 1973.

The insertion of geometrical interpretations into algebraic instruction did not significantly affect problem-solving performance. (grade 8)

Burchyett, James Albert. A Comparison of the Effects of Nongraded, Multi-Age, Team Teaching Vs. the Modified Self-Contained Classroom at the Elementary School Level. (Michigan State University, 1972.) DAI 33A: 5998-5999; May 1973.

Pupils in self-contained classrooms achieved significantly better in mathematics in grade 4; no achievement differences were found in grade 3 or 5. (grades 3-5)

Burke, Harold Reesor. A Study in Public School Accountability Through the Application of Multiple Regression to Selected Variables. (Indiana University, 1972.) DAI 33A: 4661-4662; March 1973.

A method to determine the effectiveness of individual schools in promoting arithmetic and reading achievement was developed. (grade 6)

Bybee, Frances. The Relationship Between Psycholinguistic Abilities and Reading and Arithmetic Achievement of Second Grade Children. (The University of New Mexico, 1972.) DAI 33A: 6751-6752; June 1973.

Significant correlations were found between arithmetic achievement and auditory-vocal association and auditory closure; seven other factors were correlated for an initial sample but not a replication sample. (age 7)

Camp, John Stephen. The Effects of Distributed Practice Upon Learning and Retention in Introductory Algebra. (Columbia University, 1973.) DAI 34A: 2455-2456; November 1973.

No significant differences between massed and distributed practice were found, though distributed practice resulted in slightly better retention. (grade 9)

Cargill, Jonathan D. Evaluation of Developmental First Grade Classes in Oklahoma City Public Schools. (The University of Oklahoma, 1972.) DAI 34A: 1690; October 1973.

Pupils who had a "developmental program" did not achieve significantly different scores on an arithmetic subtest (or on other measures) from comparable pupils not having such a program. (grade 1)

Carlson, Richard Tepper. An Investigation into the Effects Student Tutoring Has on Self-Concept and Arithmetic Computation Achievement of Tutors and Tutees. (Northern Illinois University, 1973.) DAI 34A: 2265; November 1973.

Tutoring or being tutored did not increase self-concept or achievement more than did working on individualized worksheets, nor did training tutors result in differences in scores. (grades 4, 6)

Carney, Harold Francis. The Relative Effectiveness of Two Methods of Teaching the Addition and Subtraction of Rational Numbers. (New York University, 1973.) DAI 34A: 659-660; August 1973.

Use of field postulates and other properties of whole numbers in teaching addition and subtraction with fractions was found to be more effective than use of objects and the number line. (grade 4)

Carri, Louis. Relationships Between Sociometrics and Academic Achievement Among Four Groups of Children in Selected Class Placements. (The University of New Mexico, 1972.) DAI 33A: 6752; June 1973.

No significant differences in arithmetic achievement were found between Spanish-surnamed and white emotionally disturbed pupils. Type of class did not affect achievement. (ages 8-11)

Centrone, Joseph John, Sr. Teacher Sociocultural Awareness in Selected Schools in New York State Accountable for American Indian Education. (Syracuse University, 1972.) DAI 33A: 5596-5597; April 1973.

No difference in mathematics achievement of pupils in segregated or integrated schools was found. (grade 3)

Chatburn, Dean Nimrod. The Influence of Selected Kindergarten Programs on Pupil Achievement in Language, Social Studies, and Mathematics at the First Grade Level. (Utah State University, 1973.) DAI 33A: 6645; June 1973.

Pupils who had private kindergarten experience scored higher on mathematics tests than those with no kindergarten experience. Pupils in the Model Cities kindergarten program scored similarly to those not attending kindergarten. (grade 1)

Chatterley, Louis Joseph. A Comparison of Selected Modes of Individualized Instruction in Mathematics for Effectiveness and Efficiency. (The University of Texas at Austin, 1972.) DAI 33A: 4663-4664; March 1973.

Use of multimedia materials with correct-answer feedback was found to be more effective than either alone, especially with medium and low achievers, for a unit on integers using IPI materials. (grade 7)

Chiappetta, Eugene Louis. The Effectiveness of Verbal Label Training in Aiding Second Grade Pupils to Transfer Their Classificatory Skill. (Syracuse University, 1972.) DAI 33A: 5545; April 1973.

Pupils trained to use concrete (value) labels in classifying objects seemed better able to classify abstract materials than did pupils having no verbal label training. Training on abstract (attribute) labels did not appear effective. (grade 2)

Christos, Constantine. Conceptual Tempo and Its Relationship to Academic Aptitude and School Achievement. (Columbia University, 1972.) DAI 33A: 6722-6723; June 1973.

Conceptual tempo was not meaningfully related to arithmetic achievement. (grade 4)

Churchman, Frank Leslie. A Comparative Study of Three Different Approaches to the Limit Concept. (University of Georgia, 1972.) DAI 33A: 4665-4666; March 1973.

No significant differences were found between the limits of sequence, delta-epsilon, or neighborhood approaches. (grades 11, 12)

Cleminson, Robert Alan. A Comparison of Attitudes and Achievement Between Elementary Mathematics Method Classes Receiving Instruction Through Two Different Methodologies--Teacher-Oriented Large Group Instruction and Student-Oriented Small Group Discussion. (The University of Iowa, 1972.) DAI 33A: 3450; January 1973.

Students taught by large-group instruction made significantly more gain in content and attitude scores than those working in small groups. No significant differences were found in methods scores. (elementary pre-service)

Connelly, Ralph D. A Taxonomic Approach to the Evaluation of Attitudes of Prospective Elementary Teachers in a Mathematics Education Course. (Kent State University, 1972.) DAI 34A: 613-614; August 1973.

Data on a taxonomy-type attitude scale (r = .91, .94) were reported. (elementary pre-service)

Covey, Donald David. An Analytical Study of Secondary Freshmen Bilingual Education and Its Effect on Academic Achievement and Attitude of Mexican American Students. (Arizona State University, 1973.) DAI 33A: 4789; March 1973.

No significant differences in mathematics scores were found between students in bilingual or regular programs. (grade 9)

Cowan, Richard Emerson. The Development and Classroom Testing of a Projective Geometry Unit for Tenth-Grade Geometry. (University of Oregon, 1973.) DAI 34A: 1058-1059; September 1973.

The developed unit, based on the incidence axioms of projective geometry, appeared feasible. (grades 9-12)

Craig, Francis Harrel. A Comparison of Two Programmed Methods of Teaching Measurement Conversion to Seventh Grade Students. (Southern Illinois University, 1972.) DAI 33A: 4791; March 1973.

The dimensional analysis method was more effective than the "traditional" method on the immediate posttest, but no significant differences were found on retention tests. (grade 7)

Crothamel, David Allen. High School Mathematics Related to College Freshman Science: A Comparison of Teacher Opinion on Use and Achievement. (The University of Michigan, 1972.) DAI 33A: 5963; May 1973.

Findings on the use and achievement of 23 mathematics items, rated by high school mathematics teachers and college science teachers, were reported. (secondary, college teachers)

Crowcroft, Harry Gordon. The Effect of Verbalization of Individually Derived Mathematical Generalizations on Transfer at Two Age Levels. (University of Maryland, 1973.) DAI 34A: 3233; December 1973.

No significant differences were found between students who verbalized or did not verbalize generalizations for arithmetic and geometric tasks. (grade 10, college)

Czarnec, Walter J. The Effects of Instruction in a Unit of Logic and Set Theory Upon the Logical Reasoning and Critical Thinking Abilities of Seniors Studying Trigonometry. (University of Georgia, 1972.) DAI 33A: 4870-4871; March 1973.

Instruction in logic significantly improved logical reasoning and critical thinking abilities. Instruction in set theory did not further improve scores. (grade 12)

Davidson, James Edward. The Impact of Selected Concrete Materials on the Understanding of Certain Mathematical Concepts by Grade 3 and Grade 4 Students. (Columbia University, 1972.) DAI 33A: 6232; May 1973.

Pupils in grade 3 who were below the grade median in IQ had significantly better conservation responses after use of materials plus the textbook than did those who used only the textbook. In grade 4, the high IQ group using materials had better conservation of length. No achievement test differences were found. (grades 3, 4)

Davis, Earl Edwin. A Comparison of the First Year Academic Achievement of Educable Mentally Retarded Children Enrolled in Middle School Resource and Self-Contained Classrooms. (The University of Alabama, 1972.) DAI 33A: 4977; March 1973.

No significant differences in mathematics achievement were found between EMRs taught in resource rooms or self-contained classrooms. (middle-school EMRs)

Davis, Thomas F. An Evaluation of a Graduate Program in Mathematics for Experienced Secondary School Teachers Sponsored by the National Science Foundation at the University of Detroit, 1958-1969. (Wayne State University, 1972.) DAI 33A: 6054; May 1973.

Increases in professional and personal status, teaching qualities, leadership activities, and knowledge of and confidence in teaching of mathematics were reported. (secondary in-service)

DeBlauw, Robert Allan. Effect of a Multimedia Program on Achievement and Attitudes of Elementary and Secondary Students. (Iowa State University, 1973.) DAI 34A: 2157; November 1973.

The three-year multimedia program resulted in significant gains in arithmetic achievement and study skills in grades 3-8. (grades 1-12)

DeLong, Douglas Dean. An Introduction to Computer Programming for Elementary or Junior High School Teachers. (University of Northern Colorado, 1973.) DAI 34A: 198; July 1973.

Programming achievement and attitude toward mathematics significantly increased following lessons requiring computer use. (elementary and secondary pre- and in-service)

DeLucia, Shirley Wood. Development of Review Packages for Improved Understanding and Use of Decimal Quantities by Upper Elementary Students. (Duke University, 1972.) DAI 33A: 4792; March 1973.

It was concluded that the developed materials were effective. (grade 6)

DeShields, James Isiah. Factors Effecting [sic] Achievement in ESEA Title I Schools and Non-ESEA Title I Schools. (University of Massachusetts, 1973.) DAI 33A: 6585; June 1973.

Students in Title I schools performed at significantly lower levels in arithmetic and reading than did students in non-Title I schools. (elementary)

Devane, James Ralph. An Exploratory Study of the Relationship Between Factors of Self-Concept and Over-Under Achievement in Arithmetic. (University of Georgia, 1972.) DAI 33A: 4932-4933; March 1973.

No significant differences in self-concept were found between high and low achievers. When achievement was dichotomized into computational and reasoning ability, actual distributions did not match hypothesized distributions. Correlations between the two aspects were .71 at grade 3 and .81 at grade 6. (grades 3, 6)

de Weffer, Rafaela del Carmen Elizondo. Effects of First Language Instruction in Academic and Psychological Development of Bilingual Children. (Illinois Institute of Technology, 1972.) DAI 33A: 5991-5992; May 1973.

Pupils taught bilingually achieved significantly better on Spanish items and as well as the monolingual group on English items on a mathematics test. (grade 1)

Doane, Bradford Sayles. The Effects of Homework and Locus of Control on Arithmetic Skills Achievement in Fourth Grade Students. (New York University, 1972.) DAI 33A: 5548; April 1973.

Students having homework achieved better than those not having homework. Students with high locus of control scores achieved better than those with low scores. (grade 4)

Dorminey, Ralph Jau Don. An Investigation of Interaction Between Selected Aptitudes and Two Methods of Presenting a Unit in Secondary School Mathematics. (University of Georgia, 1972.) DAI 33A: 3478; January 1973.

No significant achievement differences or aptitude interactions were found between groups given deductively or inductively developed materials. (grade 8)

Earle, Harold Fred. Student Attitudes Toward Geometry. (University of Maryland, 1972.) DAI 34A: 1059-1060; September 1973.

No significant differences in attitude were found between students using a computer-managed instructional program for geometry or having "traditional" instruction. (grade 10)

Earnshaw, George Livingston. Open Education as a Humanistic Intervention Strategy. (Syracuse University, 1972.) DAI 34A: 1175; September 1973.

Pupils in the open-education program did not score as well as pupils in a regular program on standardized tests of mathematics and reading. (grade 2)

Eastman, Phillip Murray. The Interaction of Spatial Visualization and General Reasoning Abilities with Instructional Treatment in Quadratic Inequalities: A Follow-Up Study. (The University of Texas at Austin, 1972.) DAI 33A: 4933; March 1973.

A significant interaction was found between aptitudes (spatial visualization or general reasoning ability) and treatment (analytical or graphical). The treatments did not result in differences in transfer scores. No advance-organizer effects were found. (grade 10)

Edgell, John James, Jr. The Relation Between Cognitive Styles of Children and Their Cognitive Strategy in the Attainment of Selected Mathematical Concepts. (The University of Texas at Austin, 1973.) DAI 34A: 2384; November 1973.

Analytic and reflective cognitive style were found to be positively related. Both analytic and reflective pupils tended to exhibit a focus strategy in demonstrating concept attainment. (grade 3)

Eklin, Duane Elmer. The Influence of a Remedial Perceptual-Motor Activity Program on the Academic Performance of Retarded Junior High School Students. (University of Minnesota, 1973.) DAI 34A: 2366; November 1973.

Improved mathematics achievement did not result from a program of remedial perceptual-motor activities. (junior high MRs)

Elsner, Priscilla Jo Edwards. A Study of Criterion-Referenced Assessment and Its Classroom Uses as Viewed by Teachers. (University of Northern Colorado, 1972.) DAI 33A: 3253-3254; January 1973.

Teachers viewed the state assessment favorably and thought test results would be useful in planning instruction. (teachers in grade 6)

Engelhardt, Jon Maurice. The Relationship Between a Dimension of Cognitive Style and the Teaching Behavior of Prospective Elementary Teachers of Mathematics. (The University of Texas at Austin, 1972.) DAI 33A: 4934; March 1973.

"Flexibility of closure" did not appear to be systematically related to teaching behavior. (elementary pre-service)

Eudy, Elaine Holland. The Effectiveness of a Mathematical Device Called a Tryab on the Arithmetic Achievement of Primary Students. (The University of Mississippi, 1973.) DAI 34A: 1479-1480; October 1973.

Use of the pegboard-flannelboard-chalkboard device did not result in higher arithmetic achievement than when the device was not used. (grade 1)

Fairley, Willie D. The Effect of "Free Transfer" Versus "Zoned" Attendance on the Achievement of Ninth Grade Students in the Areas of Reading, Mathematics and Language Arts. (Mississippi State University, 1972.) DAI 33A: 3152; January 1973.

No significant difference in mathematics achievement was found between students in zoned schools and those attending the same school by choice. (grade 9)

Fairman, Billie Jack. The Effectiveness of a Structured Mathematics Program with Culturally Deprived Kindergarten Children. (North Texas State University, 1972.) DAI 33A: 3949; February 1973.

Pupils in the structured program achieved significantly higher than pupils taught by an incidental approach. (kindergarten)

Fallon, Robert Ambrose. The Contingency Contracting Learning System: Its Effect Upon Elementary School Mathematics Achievement, Personal and Social Adjustment, and Attitude Toward School. (University of Minnesota, 1973.) DAI 34A: 2268-2269; November 1973.

Pupils using the learning system had significantly higher mathematics concept achievement than did pupils not using the system; no differences were found in computation, problem-solving, attitude, or adjustment. (elementary)

Fennell, Francis Michael. The Effect of Diagnostic Mathematics Instruction on the Achievement and Attitude of Low Achieving Sixth Grade Pupils. (The Pennsylvania State University, 1972.) DAI 33A: 3378; January 1973.

No significant differences in achievement or attitude were found between groups taught by a diagnostic or a textbook approach, though significant gains were made. (grade 6)

Ferguson, Frank Fred. Competence in Geometry of Prospective Elementary School Teachers at Chadron State College. (University of Northern Colorado, 1972.) DAI 33B: 5386-5387; May 1973.

Students who had a high school or college geometry course, a mathematics content course, or a methods course achieved better on a developed geometry test. (elementary pre-service)

Fiel, Ronald Lee. An Investigation of the Effectiveness of Formative Evaluation and Remediation in Achieving Mastery of Intellectual Skills. (Indiana University, 1972.) DAI 33A: 6057; May 1973.

Students who had an alternative form of instruction on graphs as remediation achieved significantly better than those receiving additional practice items as remediation. (grade 8)

Finnell, Clyde Allen. A Laboratory Mathematics Approach: An Evaluation of Cognitive and Affective Learning in Ninth Grade Mathematics Classes in the United States Dependents Schools, European Area. (University of Southern California, 1972.) DAI 33A: 4053-4054; February 1973.

Some significant differences favoring the groups using mathematics laboratory activites were found. (grade 9)

Fisher, Merrill Edgar. A Comparative Study of Achievement in the Concepts of Fundamentals of Geometry Taught by Computer Managed Individualized Behavioral Objective Instructional Units Versus Lecture-Demonstration Methods of Instruction. (The George Washington University, 1973.) DAI 34A: 2161; November 1973.

No significant differences in achievement were found between students using the computer-managed units or having the "traditional" geometry program. (grade 11)

Fisher, Nancy Capozzolo. Mathematical Problem-Solving's Mathelation Component Related to Achievement, Attitude, Critical Thinking in Prospective Elementary Teachers. (Indiana University, 1972.) DAI 33A: 5965-5966; May 1973.

An instrument to measure "mathelation", a component in the problem-solving process, was found to have a reliability of .83. (elementary pre-service)

Flaherty, Eileen Gertrude. Cognitive Processes Used in Solving Mathematical Problems. (Boston University School of Education, 1973.) DAI 34A: 1767; October 1973.

No significant difference in problem-solving score or time was found between students who were required to verbalize and those who remained silent, nor between "physical" and "verbal" problem solvers. (secondary)

Folk, Michael James. Influences of Developmental Level on a Child's Ability to Learn Concepts of Computer Programming. (Syracuse University, 1972.) DAI 34A: 1125; September 1973.

Developmental level was found to be a factor in the child's ability to learn and use some concepts of computer programming; it was a better predictor than IQ and achievement test scores. (grade 4)

Foster, Thomas Edward. The Effect of Computer Programming Experiences on Student Problem Solving Behaviors in Eighth Grade Mathematics. (The University of Wisconsin, 1972.) DAI 33A: 4239-4240; February 1973.

No significant differences were found between students who solved non-routine problems with or without computers and/or flow charts as aids, though some selected aspects of problem-solving were improved when aids were used. (grade 8)

Fowler, Mary Anne. The Effectiveness of Methods Courses as Evaluated by Beginning Elementary Classroom Teachers. (Lovola University of Chicago, 1973.) DAI 34A: 3203-3204; December 1973.

About one-third of the teachers indicated that an arithmetic methods course had been more effective than courses in three other subject areas. Comments on various needs are included. (elementary in-service)

Frehmer, Verl L. Cognitive Style as a Determinant of Educational Achievement Among Sixth Grade Elementary School Students. (Utah State University, 1972.) DAI 33A: 3379-3380; January 1973.

Some correlations between mathematics and cognitive style scores were reported. (grade 6)

Friedman, Morton Lawrence. The Development and Use of a System to Analyze Geometry Teachers' Questions. (Columbia University, 1972.) DAI 33A: 4215-4216; February 1973.

The median percentages of questions asked by teachers teaching a geometry theorem were: memory, 23; comprehension, 56; application, 18; higher-level, less than one per cent. (teachers in grade 10)

Frumess, Suzanne Crew. A Comparison of Management Groups Involving the Use of the Standard Behavior Chart and Setting Performance Aims. (University of Houston, 1973.) DAI 34A: 1733-1734; October 1973.

Groups in which pupils knew teacher-aims or set their own aims and charted their own scores made significantly greater gains on timed mathematics tests than did groups not knowing aims or progress. (elementary)

Gambini, Josephine Marie. Piaget's Theory: Conceptual Development and Affective Development in Diagnosed Emotionally Disturbed Public School Males. (Wayne State University, 1973.) DAI 34A: 3187-3188; December 1973.

Significant differences were found between emotionally disturbed and normal boys on six factors. (ages 8-11)

Gannon, Gerald Edward. The Development and Appraisal of a Unit on Selected Topics from Topology for Prospective Elementary School Teachers. (University of Northern Colorado, 1972.) DAI 33A: 3255; January 1973.

The unit on topology appeared to result in satisfactory achievement and attitude scores. (elementary pre-service)

Gardner, James Wise. A Study of the Effect of Pupil-Teacher Interaction on Student Achievement. (McNeese State University, 1973.) DAI 34A: 3234-3235; December 1973.

A significant difference in computation scores was found, favoring the groups receiving more indirect teacher influence; differences in reasoning, concepts, and understanding scores were not significant. (grade 6)

Garrison, Florence Marie Siegle. Attitudes of Elementary Education Majors Toward Subject Areas in Methods Courses and Student Openness-Closedness as Measured by the Rokeach Dogmatism Scale. (University of Northern Colorado, 1972.) DAI 33A: 3454; January 1973.

A significant gain in scores on attitude toward mathematics items was found after a language arts-mathematics block course. (elementary pre-service)

Gatz, Margaret Jean. Graphic Representation of Solid Objects in Young Children. (Duke University, 1972.) DAI 33B: 5015; April 1973.

The hypothesized developmental sequence was confirmed. Copying of angles and parallel lines was also ordered. (elementary)

Gau, Gerald Elmer. Toward a Theory of Sequencing: Study 1-6: An Exploration of the Effect of Instructional Sequences Involving Enactive and Iconic Embodiments on the Attainment of Concepts Embodied Symbolically. (The Pennsylvania State University, 1972.) DAI 33A: 6728; June 1973.

Instruction using one, two, or three enactive and/or iconic embodiments of a concept had essentially the same effect on ability to operate with a symbolic embodiment of the concept. (grades 5, 6)

Gildemeister, Joan Ely. Two Sources of Complexity for Children's Complex Classification Performance. (University of Maryland, 1972.) DAI 33B: 3916-3917; February 1973.

Sixth graders were superior to third graders on the classification tasks; specific aspects were reported. (grades 3, 6)

Godde, John Arthur. A Comparison of Young Children in Achievement of General Skills, Adjustment, and Attitudes, in an Individual Progression Curriculum Organization, with Young Children in a Traditional Curriculum Organization. (Northern Illinois University, 1972.) DAI 34A: 2164; November 1973.

No significant differences in mathematics achievement were found, but attitude and adjustment scores were higher for pupils in the individualized program. (kindergarten, grade 1)

Gordis, Felice Witztum. A Piagetian Analysis of the Teaching of Seriation Concepts in Four First Grade Classrooms. (Columbia University, 1970.) DAI 33B: 4994-4995; April 1973.

Teachers made two-thirds of all moves, making almost all initiatory, soliciting, and structuring moves. Simpler cognitive actions were likely to be stated in operational language. (grade 1)

Gottlieb, Harold Joseph. Relation Between Stage Competence and Classificatory Performance. (Yeshiva University, 1972.) DAI 33B: 5490-5491; May 1973.

Preoperational children did not increase their rate of categorical choices with a reduction of stimulus domination, while transitional and concrete operational children did. (ages 3-12)

Gray, Theresa Marie. A Field Study of Mathematics Laboratory Development in Youngstown, Ohio. (University of Pittsburgh, 1973.) DAI 34B: 1184-1185; September 1973.

Evaluation of a laboratory program indicated that it "was contributing to the improvement of attitudes and achievement of quite a few mathematically-deficient students." (elementary)

Greenwood, Charles Reed. Effects of Elementary Aged, Peer, Behavior Managers on Small Group, Written, Academic Response Rates. (University of Utah, 1972.) DAI 33A: 3381; January 1973.

Training resulted in peer managers for programmed mathematics instruction groups whose behaviors approximated teacher performance. Written work of students was better with trained managers than with untrained managers or teachers. (elementary)

Guarnaccia, Vincent Joseph. Pupil-Tutoring in Elementary Arithmetic Instruction. (Columbia University, 1970.) DAI 33B: 3283-3284; January 1973.

The fourth-grade group having peer-tutors gained significantly more in computation than the group not having tutors. No differences were found in concepts or applications, nor were any differences found in grade 3. Tutors learned at least as well as tutees. (grades 3, 4)

Gulick, Glenn Russell. The Effects of a Token Reinforcement System Upon Educable Mentally Retarded Children's Academic Achievement in Arithmetic. (The University of Tulsa, 1972.) DAI 33A: 4207; February 1973.

No significant differences were found between groups receiving or not receiving token reinforcers. (ages 11-17, EMRs)

Hagele, Lowell Clarke. An Analysis of Cognitive Behavior Observed in Selected Fourth-, Sixth-, and Eighth-Grade Pupils on a Unit in Mathematics. (University of Northern Colorado, 1973.) DAI 34A: 2388; November 1973.

Ability appeared to be more related to achievement at various cognitive levels than was grade placement; other factors were noted. (grades 4, 6, 8)

Hageltom, Sidahmed Mohamed Osman. An In-Service Course in Support of UNESCO Mathematics Project for the Arab States. (Columbia University, 1972.) DAI 33A: 6216; May 1973.

Participants generally achieved satisfactorily and responded well in the developed course. (secondary in-service)

Haile, James Benjamin, Sr. A Study and Analysis of the Relationships Between Selected Intelligence Factors, Selected Achievement Factors, and Academic Achievement Grades of a Selected Group of Developmentally and Functionally Retarded Junior-High-School Age Children. (The American University, 1973.) DAI 34A: 3189; December 1973.

Differences were found between developmentally and functionally retarded students on several measures (one of which was mathematics achievement). (grade 7)

Hake, Caron T. The Effects of Specified Written Comments on Achievement in and Attitude Toward Algebra and Geometry. (The Pennsylvania State University, 1973.) DAI 34A: 1700; October 1973.

No significant differences in achievement or attitude were found among given written comments of a content or a personal nature or no comments on daily assignments. (grades 8, 9)

Hamilton, Brett Basil. Control of the Conservation Response Through Discrimination Learning Set Training for Conserving and Nonconserving Transformations. (University of California, Los Angeles, 1973.) DAI 34A: 1701; October 1973.

Training was found to be effective; support was inferred for the point of view that "communication difficulties" can account for nonconservation responses. (age 5)

Happel, Donald Alfred. Factors Associated with the Extent to Which Iowa Secondary Mathematics Teachers Are Up-to-Date in Mathematics and in the Teaching of Mathematics. (The University of Iowa, 1972.) DAI 33A: 6767-6768; June 1973.

Significant differences in scores on a mathematics test were found between teachers with specified professional interests. (secondary in-service)

Harbeck, Sister Carol Ann. Experimental Study of the Effect of Two Proof Formats in High School Geometry on Critical Thinking and Selected Student Attitudes. (The Ohio State University, 1972.) DAI 33A: 4243; February 1973.

Groups using a flow-diagram format had significantly more favorable attitudes toward that format; they tended to achieve higher than groups using the statement-reason format. (grade 10)

Harper, Kenneth John. A Comparison of Three Elementary Mathematics Programs: A Model for Curriculum Evaluation. (Wayne State University, 1972.) DAI 33A: 6059-6060; May 1973.

The IPI program appeared superior to the teacher-developed and textbook programs. (grades 4, 5)

Harris, Virgil William, III. Effects of Peer Tutoring, Homework, and Consequences Upon the Academic Performance of Elementary School Children. (University of Kansas, 1972.) DAI 33A: 6175; May 1973.

Higher accuracy and rate of performance were correlated with use of peer tutors. Relatively few pupils finished homework assignments; achievement was not affected. The use of behavioral consequences resulted in better performance. (elementary)

Heighton, Ernest Lloyd. The Use of Tautologies in High School Mathematics. (University of Virginia, 1972.) DAI 33A: 3156; January 1973.

A set of 25 tautologies, selected from two algebra textbooks, appeared to be adequate for the proofs of propositions in grade 11 and 12 courses. (grades 11, 12)

Herceg, John. A Study of the Coordinator's Role in the Introduction of Formally Presented Objectives and Individualized Learning Rates in Computer Assisted Mathematics. (University of Pittsbrugh, 1972.) DAI 33A: 4059; February 1973.

Middle-track students achieved better when they were aware of objectives, but achieved lower with programmed cassette tapes than students in the traditional program did. No significant differences were found for top-track students. (grade 11)

Herman, Maureen Lewis. Patterning Before Mathematics in Kindergarten: The Effect of a Patterning Treatment on the Children's Ability to Learn Number Concepts Later in the Year. (Columbia University, 1972.) DAI 33A: 4060; February 1973.

The patterning treatment appeared to have some positive effects on achievement during the year. (kindergarten)

Higdon, Danny Wallace. A Comparison of Mathematical Attitudes and Competence of Selected Prospective and Experienced Elementary Teachers in the State of Texas During the 1971-72 Academic Year. (University of Houston, 1972.) DAI 34A: 202; July 1973.

While attitudes and achievement of pre- and in-service teachers were significantly related, experienced teachers scored higher on applications and attitude measures. (elementary pre- and in-service)

Higdon, Gene Harold. A Comparative Study of the Achievement in Mathematics of Sixth Grade Students According to Type of School Organizational Pattern and Selected Teacher Variables. (McNeese State University, 1973.) DAI 34A: 2918; December 1973.

Students of black teachers with masters degrees achieved better than students of other teachers. (grade 6)

Hill, Jerry Glynn Matthews. A Comparative Study of Academic Achievement of Intermediate Level Students in an Open Concept School and a Conventional School. (McNeese State University, 1973.) DAI 34A: 2918-2919; December 1973.

Students in an open-concept thermal-controlled school generally achieved better in arithmetic than did students in a conventional non-thermal-controlled school. (grades 3-6)

Hirsch, Christian Richard, Jr. An Experimental Study Comparing the Effects of Guided Discovery and Individualized Instruction on Initial Learning, Transfer, and Retention of Mathematical Concepts and Generalizations. (The University of Iowa, 1972.) DAI 33B: 3194-3195; January 1973.

The guided discovery group had significantly higher achievement and transfer than either of two individualized instruction groups. (grade 11)

Hoffman, Nathan. Geometry in Mathematics: A Survey of Some Recent Proposals for the Content of Secondary School Geometry. (University of Montana, 1973.) DAI 34A: 3026; December 1973.

It was concluded that geometry should be taught as an integrated course including vector, transformation, and coordinate methods. It should not be primarily a vehicle for teaching axiomatics. No justification was found for teaching geometry (and no other mathematics) in grade 10. (secondary)

Hoffmann, Joseph Raymond, Jr. A Heuristic Study of Key Teaching Variables in Junior High School Mathematics Classrooms. (University of Illinois at Urbana-Champaign, 1972.) DAI 34A: 665; August 1973.

Teacher-pupil transactions were identified and coded on five dimensions. (teachers in junior high schools)

Holz, Alan W. A Technique for Studying Presentation Variables in Mathematics Text. (Purdue University, 1972.) DAI 33A: 4677; March 1973.

The system, for classifying messages in text according to content and mode and for analyzing the information, appeared valid and was used with a satisfactory level of interrater reliability. (grades 4-12)

Hosey, Harold Roy. Cognitive and Affective Growth of Elementary School Students Who Participated in Summer Head Start. (Oklahoma State University, 1972.) DAI 33A: 6591-6592; June 1973.

The Head Start group scored higher in arithmetic application than the group not having Head Start. (kindergarten-grade 4)

Houde, Richard A. The Effectiveness of Positive and Negative Instances on the Attainment of the Geometric Concept of "Similarity" by Sixth Grade Students at Two Intelligence Levels. (The University of Tennessee, 1972.) DAI 33A: 3955; February 1973.

Alternating positive and negative instances or providing all positive instances was significantly better than giving all negative instances or no instances. IQ was related to performance. (grade 6)

House, Peggy A. The Learning Environment as a Predictor of the Academic Self-Concepts of Ninth Grade Mathematics Students. (Kansas State University, 1973.) DAI 34A: 2460; November 1973.

It was possible to predict both general and mathematical self-concept scores from a combination of selected characteristics of the learning environment. (grade 9)

Hughes, Fergus Peter. A Developmental Investigation of the Cognitive Components Necessary for Euclidean Spatial Functioning in the Child. (Syracuse University, 1972.) DAI 34B: 1257. September 1973.

Performance on both a classification task requiring measurement and a "landscape" problem improved significantly with age. Measurement ability appeared present before the ability to attend simultaneously to two dimensions. (ages 3-4, 6-7, 9-10)

Hughes, Frank George. A Comparison of Two Methods of Teaching Multidigit Multiplication. (The University of Tennessee, 1973.) DAI 34A: 2460-2461; November 1973.

Groups using the lattice method were able to compute in significantly less time and more accurately than groups using the distributive method. No significant differences in understanding or attitude were found. (grade 4)

Hummel, Harvey Morton. The Relationships Between Success in Teaching and Certain Personality Factors, Persistence in Teaching, and Educational Attainment of Experienced Secondary Teachers. (University of Minnesota, 1972.) DAI 33A: 6176; May 1973.

On six pupil-reaction factors, mathematics teachers were ranked lowest. Mathematics teachers receiving high pupil ratings were placid, relaxed and low in anxiety. (secondary in-service)

Hutcheson, James Winston. A Comparison of the Effectiveness of a Laboratory-CAI-Discussion Strategy and a Laboratory-Discussion Strategy in the Teaching of Mathematics. (Auburn University, 1973.) DAI 34A: 2271; November 1973.

No significant differences were found between the two strategies studied, though both were effective. (grade 9)

Hutchings, Lloyd Benjamin: An Examination, Across a Wide Range of Socioeconomic Circumstance, of a Format for Field Research of Experimental Numerical Computation Algorithms, an Instrument for Measuring Computational Power Under Any Concise Numerical Addition Algorithm, and the Differential Effects of Short Term Instruction in Two Experimental Numerical Addition Algorithms and Equivalent Practice with the Conventional Addition Algorithm. (Syracuse University, 1972.) DAI 33A: 4678; March 1973.

The experimental rapid-acquisition algorithm produced "a quick, strong increase in compuational power"; conventional practice resulted in some improvement; non-treatment had little effect, and an alternative experimental algorithm was debilitating. (grade 5)

Ibe, Milagros Dimal. The Effects of Using Estimation in Learning a Unit of Sixth Grade Mathematics. (University of Toronto (Canada), 1971.) DAI 33A: 5036; March 1973.

The groups taught to estimate had significantly higher scores for achievement, transfer, and estimation. (grade 6)

Impara, James Clement. An Experimental Comparison of Matrix Sampling and Examinee Sampling for Estimating Test Norms for Different Target Groups on Different Types of Tests. (The Florida State University, 1972.) DAI 33A: 4942; March 1973.

Matrix sampling appeared feasible for estimating mean achievement in the two test domains studied (arithmetic computation and word knowledge) for both disadvantaged and non-disadvantaged pupils. (grade 4)

Ingle, Henry Thomas. An Attitude-Change Study on Children's Perceptions of the Computer as an Expert Source of Information. (Stanford University, 1973.) DAI 33A: 6592; June 1973.

Pupils had lowered perceptions of the computer's expertise after using the CAI programs on logic or drill-and-practice. (grades 5, 7, 9)

Jackson, Adam. Teaching Analytical Trigonometry Via Tranformations: A Comparison with the Wrapping Function Approach. (The Florida State University, 1972.) DAI 33A: 3258-3259; January 1973.

Students understood the transformation approach as well as the wrapping function approach. (grade 11)

James, Jerusha Ann Cobb. A Study of the Effects of Problem-Solving Strategies Developed in Teacher In-service Workshops on Fourth and Fifth Grade Childrens' Achievement. (Wayne State University, 1972.) DAI 33A: 6649-6650; June 1973.

The developed in-service program and procedures for the study were presented; no results were cited. (teachers in grades 4, 5)

Jay, Winifred Tom. Sex Stereotyping in Selected Mathematics Textbooks for Grades Two, Four and Six. (University of Oregon, 1973.) DAI 34A: 3028; December 1973.

Parents and students coded 71 per cent of textbook content as "neutral", 14 per cent as "masculine", and 6 per cent as "feminine". Instances of sex bias are noted. (grades 2, 4, 6)

Jensen, Linda Rae. The Relationships Among Mathematical Creativity, Numerical Aptitude and Mathematical Achievement. (The University of Texas at Austin, 1973.) DAI 34A: 2168-2169; November 1973.

Low correlations were found between creativity and aptitude scores, and between creativity and achievement. Girls scored higher than boys on the creativity measure. (grade 6)

Johnson, Gerald Singleton. The Interrelationships of Cognitive and Affective Variables in a Sample of Educationally Handicapped Pupils in Three Types of Class Placement and in Three Age Groups. (University of Southern California, 1972.) DAI 33A: 3385-3386; January 1973.

Little relationship was found between attitudes and achievement in arithmetic, reading, or spelling. (elementary)

Johnson, Howard Cornelius. The Effects of Advance Organizers on the Child's Egocentric Thinking and Centration in Learning Selected Mathematical Concepts. (Northwestern University, 1973.) DAI 34B: 2778-2779; December 1973.

Students having advanced organizers for materials on transformational geometry scored significantly higher than students having post organizers or no organizers. Students given several concrete models achieved higher than those given only one model. (grade 4)

Johnston, Herbert James. The Effect of Grouping Patterns on First-Grade Children's Academic Achievement and Personal and Social Development. (University of Miami, 1973.) DAI 34A: 2461; November 1973.

No significant differences were found between pupils heterogeneously grouped by stratification for arithmetic or in a non-stratified group. (grade 1)

Jones, Bobby. A Comparison of Teachers' and Students' Perceptions of Learning Opportunities Provided in Elementary School Classrooms. (University of Georgia, 1973.) DAI 34A: 3028-3029; December 1973.

Differences were found between mathematics/science teachers' and language arts/social studies teachers' perception of learning opportunities, and between teachers' and students' perceptions. (grade 5, teachers)

Keane, Dorothy Louise. An Exploration and Analysis of the Nuffield Mathematics Teaching Project with Reference to its Current Use in Selected British Schools. (Wayne State University, 1973.) DAI 34A: 3029; December 1973.

The development, implementation, and evaluation of the program; the role of teacher centres; and perceptions of teachers involved in the program are among the factors discussed. (ages 5-13, teachers)

Kenny, David A. The Measurement and Explanation of Population Effects: Sex Differences in Mathematics and Science in a Longitudinal Study. (Northwestern University, 1972.) DAI 33B: 4999; April 1973.

Increasing sex-typing in mathematics and science ability was found over time, preceded by greater sex differences in concrete skills. Skills in reading comprehension and writing ability appeared to be related to decreases in mathematics and science abilities. (grades 5, 7, 9, 11)

Kern, Donald. A Comparison of Strategies for Sequencing Mathematics Materials. (University of Georgia, 1973.) DAI 34A: 3031; December 1973.

Students who used the programmed unit where eight subtasks for solving $ax + b = c$ were sequenced according to a consistency ratio did better in terms of immediate achievement than did students having different random orders of the subtasks; retention was not significantly different. (grade 7)

Khan, Akhter. Children's Use of Perceptual Groupings in Counting. (University of Oregon, 1972.) DAI 33A: 4944; March 1973.

Counting ability was strongly affected by variations in the similarity and contiguity of objects in an arrangement. The contiguous arrangement of subgroups facilitated perceptual grouping of objects, which aided counting the total. (ages 3-5)

Kidder, Francis Richard. An Investigation of Nine, Eleven, and Thirteen Year-Old Children's Comprehension of Euclidean Transformations. (University of Georgia, 1973.) DAI 34A: 3238-3239; December 1973.

Students had difficulty performing Euclidean transformations, compositions of transformations, and inverse transformations in all modes of testing. Sixty-five per cent of all errors on the task were failures to conserve length. (ages 9, 11, 13)

Kiehl, Charles Frank. The Application of the Discriminant Function in Developing a Predictor of Success in Mathematics for Grades Four, Five, Six, Seven, and Eight. (State University of New York at Buffalo, 1973.) DAI 33A: 5408-5409; April 1973.

Two computer programs were developed for use in predicting achievement and classifying into groups. (grades 4-8)

Kove, Lila Barth. Deductive Reasoning and Problem Solving. (The University of Connecticut, 1973.) DAI 34A: 1487; October 1973.

Deductive reasoning and problem-solving scores were significantly correlated. Problem-solving ability was not affected by the two-week unit on deductive reasoning. (grade 7)

Krug, David A. An Investigation of the Effects of Experimental Manipulation of a Token System on Rate of Computation. (University of Washington, 1972.) DAI 33A: 4208-4209; February 1973.

Under both daily and weekly pay-off conditions, the group contingent pay-off system as as effective in controlling student behavior while doing mathematics skill sheets as was the individual contingent condition. (mean CA 10.3, EMRs)

Kuefler, Melvin Mathias. An Evaluation of the Effectiveness of a High School Remedial Education Program. (University of Oregon, 1972.) DAI 33A: 5441; April 1973.

The remedial program was found to be effective in three of four mathematics courses. (secondary)

Kuenz, Marjorie Anne. The Relationship of Non-Cognitive Variables to Academic Achievement Measures in High School Students. (The University of Florida, 1972.) DAI 34A: 3145-3146; December 1973.

Although a measure of non-cognitive variables contributed to the prediction of mathematics problem-solving scores for both boys and girls, and to computation and concepts scores for girls, increases were not significant. (secondary)

Kwansa, Kofi Bassa. Investigation of the Relative Content Validity of Norm-Referenced and Domain-Referenced Arithmetic Tests. (University of Pittsburgh, 1972.) DAI 33A: 3959-3960; February 1973.

The domain-referenced tests had higher content validity than the norm-referenced tests. Scores on the two forms correlated highly. (grade 6)

Labaki, Felix George. The Development of a Scale for Measuring the Attitudes of Middle-School and High-School Students Toward Geometry. (State University of New York at Buffalo, 1973.) DAI 34A: 1704-1705; October 1973.

The developed scale was found to have a reliability of .92, with five subscale reliabilities ranging from .67 to .84. (middle- and high-school)

Leitch, Vernon Dale. A Comparative Study of the Active Learning Approach and the Lecture Discussion Method of Instruction for Prospective Elementary Teachers. (University of Northern Colorado, 1972.) DAI 33A: 3464; January 1973.

The activity-oriented approach resulted in significantly greater achievement and a more positive attitude toward mathematics than the lecture-discussion method did. (elementary pre-service)

Leonard, William A. The Development and Appraisal of a Unit on Simple Continued Fractions for Prospective Elementary School Teachers. (University of Northern Colorado, 1972.) DAI 33B: 5394-5395; May 1973.

Achievement on the developed unit was satisfactory and attitudes were positive. (elementary pre-service)

Lester, Frank Klein, Jr. Developmental Aspects of Human Problem Solving in a Simple Mathematical System Via Computer Assisted Instruction. (The Ohio State University, 1972.) DAI 33A: 4178; February 1973.

Problem-solving ability was found to increase with age, but certain aspects of proof could be taught in upper elementary grades. (grades 1-12)

Levine, George Ivan. Actual and Perceived Attitudes Toward Mathematics of Pupils and Their Mothers. (Columbia University, 1972.) DAI 33A: 3960; February 1973.

Of four variables, only achievement level consistently played a significant role in the relationship of pupil-attitudes and perception of those attitudes. (grades 6-8)

Lewis, Jimmy Costilla. A Comparison of the Mathematics Achievement of Black Students in Racially Mixed and Non-Racially Mixed Schools. (The University of Texas at Austin, 1972.) DAI 33A: 4683; March 1973.

A significant difference in mathematics achievement favoring students in racially-mixed schools was found at ninth-grade level, but the difference was not significant in grade 10. (grades 9, 10)

Lewis, William Eugene. Effects of Rate and Accuracy of Test Responses, Removal of Test Time-Limits and Teacher Expectancies on Achievement Test Scores of Disadvantaged Third Grade Students in Denver. (Oregon State University, 1973.) DAI 34A: 2170-2171; November 1973.

Extending time limits on standardized tests aided some slow-responding pupils. On the computation subtest, almost all pupils finished within the standardized time limit. (grade 3)

Linton, Thomas, Jr. The Effects of Grade Displacement Between Student Tutors and Students Tutored. (University of Cincinnati, 1972.) DAI 33A: 4091-4092; February 1973.

Tutors from grade 12 were more effective for helping eighth graders in mathematics than were tutors from grade 8 or 10. (grades 8, 10, 12)

Lopata, David John. The Effects of Learning Sets on Conservation Acquisition in Blind and Sighted Children. (The Catholic University of America, 1973.) DAI 34B: 859; August 1973.

Both blind and sighted children made significant gains after instruction on conservation of substance, and evidenced transfer to conservation of weight. Differences between blind and sighted children were also significant. (ages 5-6, 8-13)

Lorenzen, Fred Joseph, Jr. An Investigation of the Learning of Advanced Equality and Inequality Concepts by Third Grade Children. (Syracuse University, 1972.) DAI 34A: 1003-1004; September 1973.

Some significant change-scores were noted immediately after instruction on equality and inequality concepts, but no differences were found on the retention test. Results do not support the grade placement of the advanced program. (grade 3)

Lytle, Archie Kirtly, III. The Effects of Two Learning Sequences on Achievement, Transfer, and Retention of the Limit Principle by Eleventh and Twelfth Year Students. (The University of Michigan, 1973.) DAI 34A: 1772-1773; October 1973.

At the algebra II level, lessons based on the limit of real-valued sequences produced significantly better achievement than those based on the real-valued function. No differences were found in the analysis class. (grades 11, 12)

MacDonnell, Joseph Francis. An Analysis of Selected Aspects of the UNESCO Mathematics Program for the Arab States and Iraq's Present Secondary School Mathematics Program. (Columbia University, 1972.) DAI 33A: 3961-3962; February 1973.

The UNESCO texts used a modern approach while Iraqui texts did not. (secondary)

Malcom, Paul Joseph. Analysis of Attitude, Achievement, and Student Profiles as a Result of Individualized Instruction in Mathematics. (The University of Nebraska, 1972.) DAI 33A: 3261-3262; January 1973.

Significant differences in achievement and attitude favoring students using a teacher-developed program over a traditional program were found at grades 7 and 9 but not grade 8. (grades 7-9)

Martau, Gerald Edward. The Development of a Model Mathematics Methods Component of an Elementary School Teacher's Preparation. (The University of Toledo, 1972.) DAI 34A: 651; August 1973.

Use of the instructional module resulted in achievement gains and changes in attitude. (elementary pre- and in-service)

Mazzei, Joseph. The Use of Feedback and Reinforcement in Controlling Maladaptive Classroom Behavior. (West Virginia University, 19[illegible].) DAI 33B: 6088; June 1973.

The greatest increase in per cent correct for pupils working on arithmetic problems occurred for the divergent-feedback-plus-reinforcement group. (elementary)

McCabe, James Joseph. The Strength of IQ and Creativity in Predicting Academic Achievement Among Educable Retarded Students. (University of Georgia, 1973.) DAI 34A: 3191; December 1973.

Figural elaboration and IQ scores contributed best to the prediction of concepts and problem-solving scores; figural originality and IQ best predicted computation scores. (ages 10-11, EMRs)

McClain, Paul David. The Relationship Between Performance on Conservation Tasks and Developmental AGe. (University of Northern Colorado, 1972.) DAI 33A: 3393; January 1973.

Each of six conservation tasks was significantly correlated with tests of developmental age. (ages 5-8)

McDaniel, Roland. The Identification and Description of Changes in Mathematics Programs in the Secondary Schools in Tennessee Which Have Used NDEA Title III Funds. (The University of Tennessee, 1972.) DAI 33B: 5395-5396; May 1973.

Teachers and supervisors from schools having four or more projects indicated that they observed improvement in students and teachers as a result of use of Title III-funded materials and equipment. (secondary)

McGinty, Robert LeRoy. The Effects of Four Methods of Instruction Upon the Ability of Second and Third Grade Students to Derive Valid Logical Conclusions from Verbally Expressed Hypotheses. (Michigan State University, 1972.) DAI 33A: 4686; March 1973.

Pupils given instruction on attribute blocks, pictorial logic, or set theory scored higher on logic and classification tests than pupils not having logic instruction. (grades 2, 3)

McLaughlin, Jane Ann. The Relationship of Open-Ended vs. Closed-Ended Mathematics Laboratory Activities to the Divergent Thinking Ability of Pre-Service Elementary Teachers. (Columbia University, 1973.) DAI 34A: 651-652; August 1973.

Divergent-thinking ability and performance on both open- and closed-ended laboratory activities were found to be independent, and no association was found between divergent-thinking ability and attitude toward mathematics. (elementary pre-service)

McLeod, Douglas B. The Effectiveness of an Inservice Program for Implementing an Activity Approach to Learning Mathematics in the Elementary School. (The University of Wisconsin, 1972.) DAI 33A: 4222; February 1973.

The in-service program was successful in helping most teachers to implement an activity-oriented program. (teachers in kindergarten, grade 1)

McMillian, Joe Adair. Learning a Mathematical Concept With and Without a Physical Model as Predicted by Selected Mental Factors. (University of Houston, 1972.) DAI 33A: 4182; February 1973.

No significant differences in learning, retention, or transfer were found for students who used individual materials for a unit on non-decimal numeration with or without a physical model. Success could be predicted with selected mental factors. (grade 7)

Mehl, John Walter. Parental Attitude Toward the School, Student Confidence Level of Academic Ability, Selected Indices of Student Achievement: A Comparative Study of Relationships. (Michigan State University, 1973.) DAI 34A: 1099-1100; September 1973.

Parents' attitude toward school and student confidence level of academic ability were significantly related to indices of student achievement including mathematics percentile scores. (intermediate)

Melnick, Gerald Irving. A Mechanism for Transition of Concrete to Abstract Cognitive Processes. (Yeshiva University, 1972.) DAI 33B: 3354; January 1973.

Stimulus intensity and color were found to affect conservation responses of both normal and retarded children. (elementary, EMRs)

Milner, Stuart Dennis. The Effects of Teaching Computer Programming on Performance in Mathematics. (University of Pittsburgh, 1972.) DAI 33A: 4183-4184; February 1973.

Students learned the concept of variable through computer programming. No differences were found between three methods of teaching programming. (grade 5)

Mitchell, Bruce Alex. The Effect of a Teacher-Developed Unit in Hyperbolic Geometry on Structural Objectives in Tenth Grade Geometry. (The Ohio State University, 1972.) DAI 33A: 5978-5979; May 1973.

Classes using the developed unit on non-Euclidean geometry reverted to use of Euclidean geometry. (grade 10)

Mitchell, Charles, Jr. A Comparative Study of the Achievement Levels of Elementary School Children in the Areas of Reading and Mathematics in the Highland Park School System from 1961-1971. (Wayne State University, 1972.) DAI 33A: 6067; May 1973.

In only two of the ten years were scores in mathematics and reading above expected norms. (grade 6)

Moncrief, Michael Howard. A Validation Study of Selected Decision Rules Used in the Management of Student Progress Through an Individualized Mathematics System. (The Florida State University, 1972.) DAI 33A: 4247; February 1973.

Actual criterion levels differed from levels indicated by the program-developers. (elementary)

Montgomery, Mary Eleanor. The Interaction of Three Levels of Aptitude Determined by a Teach-Test Procedure with Two Treatments Related to Area. (The University of Wisconsin, 1972.) DAI 33A: 4068-4069; February 1973.

No significant interactions were found between pupils at two aptitude levels given units differing in emphasis. (grades 2, 3)

Montgomery, Robert Lawrence. A Study of Relationships between Group Test of Creativity (GTOC) Scores and Achievement Test Scores of Students with Spanish and Non-Spanish Surnames. (University of Southern California, 1973.) DAI 34A: 3149; December 1973.

Students with non-Spanish surnames achieved significantly higher scores in arithmetic achievement than did students with Spanish surnames. Sensitivity to Problems scores were highly related to arithmetic achievement for advantaged students. (grade 6)

Morrison, Grant Albert, Jr. An Analysis of Academic Achievement Trends for Anglo-American, Mexican-American, and Negro-American Students in a Desegregated School Environment. (University of Houston, 1972.) DAI 33A: 6024-6025; May 1973.

Significant differences in achievement on arithmetic concepts were found between ethnic groups in segregated or non-segregated schools over a six-year period. (grades 3-8)

Morrison, Shirley L. Instructional Expenditures and Learning Performance of Third Graders in New York State. (Fordham University, 1973.) DAI 34A: 2175; November 1973.

Instructional costs were not significantly related to achievement on mathematics and reading tests. (grade 3)

Mundy, Michael Jerome. An Analysis of an Academically Structured Head Start Program For: (1) Geographic, (2) Academic Treatment, and (3) High-Low Subject Ability Variables. (Auburn University, 1973.) DAI 34A: 2395; November 1973.

Pupils who scored high on a psycholinguistic abilities test made greater gains on a numbers subtest regardless of whether or not they had Bereiter-Engelmann arithmetic training, while low-scoring pupils showed gains as a function of training. (age 5)

Mwaniki, Mebo Kabeta. The Relationship Between Self-Concept and Academic Achievement in Kenyan Pupils. (Stanford University, 1973.) DAI 34A: 1138; September 1973.

Significant sex differences were found for Kenyan pupils on mathematics achievement measures. (grade 7)

Nelson, Barbara Ann. Effects of the Analytic-Global and Reflectivity-Impulsivity Cognitive Styles on the Acquisition of Geometry Concepts Presented Through Emphasis or No Emphasis and Discovery or Expository Lessons. (The University of Wisconsin, 1972.) DAI 33A: 4949; March 1973.

In two brief studies, (1) lessons emphasizing relevant attributes did not benefit "global" students more than "analytic" students and (2) expository lessons did not benefit impulsive students more than reflective students. (grade 7)

Nelson, Rebecca Sue Russell. Objectives for Mathematics Methods Courses for Undergraduate Elementary Education Majors Throughout the United States. (Indiana University, 1972.) DAI 33A: 6221-6222; May 1973.

Instructors disagreed on the emphasis to be given various objectives, but generally agreed on which objectives were appropriate for a given course. (elementary pre-service instructors)

Newstat, Steven. A Study of the Relationships Between Sociocultural Variables and Geometric Problem Solving Performances of Disadvantaged Children. (Michigan State University, 1972.) DAI 33A: 6069; May 1973.

Family characteristics, the presence or absence of a father, and crowding produced no systematic effect on the performance of students on geometry materials. (junior high)

Nyeste, Rev. John Joseph. An Evaluation of Unasex Grouping in the Fourth Grade. (West Virginia University, 1972.) DAI 33A: 6027; May 1973.

No significant differences in arithmetic concepts and skills were found between boys in single-sex or both-sex classes. (grade 4)

O'Connell, William B., Jr. An Investigation of the Value of Exposing Slow-Learner Ninth Year Mathematics Pupils to a Relatively Short Computer Experience. (The University of Rochester, 1973.) DAI 34A: 124-125; July 1973.

No significant difference in achievement was found between groups who had two weeks of skills tests and other activities via a computer or had regular classroom instruction. (grade 9)

O'Donnell, John Raymond. Academic Achievement of the Secondary Educable Mentally Handicapped Student. (University of Southern California, 1973.) DAI 33A: 6756-6757; June 1973.

Little learning seemed to be taking place in the EMR junior high classroom and even less at the secondary level. Students progressed an average of one month in computational ability for each year in special education. (grades 7-12, EMRs)

Olson, Arthur H. The Relationship Between Achievement Motivation of Students and Their Academic Achievement During the High School Years. (Northern Illinois University, 1972.) DAI 33A: 4248-4249; February 1973.

For tenth-grade boys only, a significant negative correlation was found between achievement motivation score and an arithmetic score. (grades 10-12)

Otillar, Doris M. The Effects of Systematic Consultation on Teacher Behavior and Student Achievement in Rural Deprived Elementary Schools. (The University of Wisconsin, 1973.) DAI 34A: 3067; December 1973.

Teachers exhibited significantly more attending and approval behaviors after an in-service program. Their pupils made greater gains in mathematics and other areas than did a control group, but gains were not significant. (elementary in-service)

Ouellette, Hugh Francis. Effects of Enrichment Problems on Attitude, Problem Solving Ability and Pattern Recognition Ability of Prospective Elementary School Teachers. (University of Northern Colorado, 1972.) DAI 33A: 6222; May 1973.

Predictors of achievement on the developed materials were found. The unit was considered satisfactory. (elementary pre-service)

Owens, Douglas Timothy. The Effects of Selected Experiences on the Ability of Disadvantaged Kindergarten and First Grade Children to Use Properties of Equivalence and Order Relations. (University of Georgia, 1972.) DAI 33A: 5042; March 1973.

It was concluded that the treatment was not effective in improving ability to conserve matching relations. (kindergarten, grade 1)

Parker, DeAnsin Goodson. The Effects of Method of Hierarchical Organization and Sequence on Children's Learning. (Columbia University, 1973.) DAI 34A: 3036-3037; December 1973.

No significant differential effects were found in learning specific terminal objectives according to different methods of hierarchy generation and sequencings of subordinate tasks. (grades 5, 6)

Patt'son, Sylvia Jean. Evaluation as a Fundamental Part of Curriculum Development: A Study of Teaching Concepts of Estimation and Measurement to First-Grade Children. (University of Illinois at Urbana-Champaign, 1972.) DAI 34A: 560-561; August 1973.

The process of developing curriculum materials on metric measurement was recorded and analyzed. (grade 1)

Paul, Oliver Dave. The Relationship of Student-Teacher Compatibility on Student Achievement in Algebra. (Auburn University, 1973.) DAI 34A: 1180; September 1973.

A positive relationship was found between some measures of teacher-pupil compatibility and student achievement. (grade 9)

Pendleton, Julienne Marie Kesmodel. Mathematical Concept Attainment of Sixth Grade Students in Relation to Their Cognitive Styles. (The University of Texas at Austin, 1972.) DAI 33A: 5043; March 1973.

Reflective pupils tended to use focussing strategies while impulsive pupils tended to use scanning strategies. (grade 6)

Penner, William James. Effects of Cue Word Form Class on the Solving of Arithmetic Word Problems by the Mentally Handicapped. (The University of Connecticut, 1973.) DAI 34A: 2424-2425; November 1973.

Both mental age and cue-word-form class influenced the selection of computational operation for problems. The percentage of correctly read cue words was greater than the percentage of correctly selected operations. (MA 7-10, MRs)

Perciante, Terence Hugh. The Influence of Visual Perception Upon the Development of Geometrical Concepts. (State University of New York at Buffalo, 1973.) DAI 33A: 5560; April 1973.

Differences in the effect of visual factors were found between rural and urban samples. (grade 2)

Peterson, Gary Davis. The Preparation, Administration, and Interpretation of an Achievement Test in Geometry for Fourth, Fifth, and Sixth Grades. (University of Kansas, 1973.) DAI 34A: 3242; December 1973.

A potentially reliable geometry achievement test was constructed. No difference in achievement of boys and girls was found. (grades 4-6)

Phillips, John Durwood. The Relationship Between Selected Piagetian Tasks and Knowledge of the Content Areas in Fifth-Grade Children. (East Texas State University, 1972.) DAI 33A: 6778; June 1973.

A relationship was found between mathematics computation scores and ability to conserve mass, weight, or volume, but not between conservation and mathematics concepts or total mathematics scores. (grade 5)

Podbelsek, Allan Roy. A Study of Various Deductive Models for Developing and Teaching Plane Trigonometry Including an Investigation of the General Nature of Trigonometry. (University of Illinois at Urbana-Champaign, 1972.) DAI 33B: 4916; April 1973.

The history, general structure, models for development, and analysis of trigonometry were presented, for use in teacher education programs. (secondary pre-service)

Poggio, John Paul. Prediction of Mathematics Achievement at the Sixth Grade Level Employing Selected Personality Characteristics of Students and Their Teachers. (Boston College, 1972.) DAI 33A: 6240-6241; May 1973.

Grouping on the basis of personality characteristics was found to be feasible, but factors differed for boys and girls. (grade 6)

Pond, Thomas Francis, Jr. Individualized Instruction: A Model for Teacher Preparation. (The University of North Dakota, 1973.) DAI 34A: 3220; December 1973.

A program of individualized instruction for mathematics education students had a significant positive effect on students' attitudes toward individualized instruction. (elementary pre-service)

Portis, Theodore Roosevelt. An Analysis of the Performances of Fourth, Fifth and Sixth Grade Students on Problems Involving Proportions, Three Levels of Aids and Three I.Q. Levels. (Indiana University, 1972.) DAI 33A: 5981-5982; May 1973.

Performance on tests using physical and pictorial aids was significantly higher than when only symbolic aids were used. (grades 4-6)

Posamentier, Alfred S. Mathematical Achievement and Attitudinal Differences Among Students and Attitudinal Differences Among Teachers Under a Two-Semester and a Three-Semester Elementary Algebra Course. (Fordham University, 1973.) DAI 34A: 2279-2280; November 1973.

Achievement and attitude differences were found between students in the two- or three-semester course, with some variance in different tests. Teacher preference was related to what they had taught. (grade 9)

Purser, Jerry Donaldson. The Relation of Manipulative Activities, Achievement and Retention, in a Seventh-Grade Mathematics Class: An Exploratory Study. (University of Georgia, 1973.) DAI 34A: 3255-3256; December 1973.

It was concluded that increased use of manipulative activities was feasible. (grade 7)

Putoff, Orval Edward, Jr. An Evaluation of Transfer Following Discovery Oriented Tutoring of Young Children on Classification and Related Tasks. (Claremont Graduate School, 1973.) DAI 33B: 4494-4495; March 1973.

A variety of transfer effects were achieved through non-didactic teaching of classification and related tasks. (grades 1, 2)

Pyrczak, Fred, Jr. Objective Evaluation of the Quality of Multiple-Choice Test Items. (University of Pennsylvania, 1972.) DAI 33A: 3401; January 1973.

The conventional discrimination index appeared to be a moderately valid measure of item quality for two forms of an arithmetic test, though a substantial amount of inter-rater variability remained unexplained. (elementary)

Raba, Sister Mary Helen. A Study of Interaction of Aptitude and Treatment in Algebra I. (Columbia University, 1973.) DAI 34A: 71; July 1973.

Quantitative and verbal variables contributed significantly to prediction, but achievement differences between groups using books differing in the amount of verbal explanation were not found. (grade 9)

Rathmell, Edward Cary. The Effects of Multibase Grouping and Early or Late Introduction of Base Representations on the Mastery Learning of Base and Place Value Numeration in Grade One. (The University of Michigan, 1972.) DAI 33A: 6071-6072; May 1973.

No significant differences were found between using various bases or only base ten in grouping objects. The group having reading and writing experiences before grouping experiences achieved better than the group given grouping experiences first. (grade 1)

Reavis, H. Kenton. The Development and Validation of a Mediated Basic Math Facts Teaching Program for Application by Parents. (Utah State University, 1972.) DAI 33A: 4986; March 1973.

The teaching packages appeared to be effective, though no differences in achievement were found after control groups were given an unspecified treatment. (elementary)

Rebhun, Albert Mitchell. The Reflective-Impulsive Dimension and Mathematical Performance in the Elementary School. (University of California, Los Angeles, 1973.) DAI 34A: 3039-3040; December 1973.

Children classified as reflective scored higher on mathematics tests than did children classified as impulsive. (grades 2-4)

Regula, Charles Richard. A Study of the Relative Importance of Selected Pre-Skills and the Effects of Group and Individual Instruction in the Use of the DOT Overlay Technique in Teaching Addition to the Educable Mentally Retarded. (University of Oregon, 1972.) DAI 33A: 6757; June 1973.

The DOT overlay technique was found to be effective. (ages 8-12, EMRs)

Reynolds, Philip Roger. Understanding Conditional Statements at the Tenth Grade Level. (The University of Rochester, 1973.) DAI 34A: 125; July 1973.

Students in algebra 2 classes (before geometry) scored significantly higher on a test of conditional reasoning than did students in geometry classes (before algebra 2). For all students, scores were higher for test items written in the geometric rather than the algebraic content area. (grade 10)

Richer, Howard Marshall. Peer Teaching as a Facilitator of Learning: Using Conservation of Substance as a Measure. (University of California, Los Angeles, 1973.) DAI 34A: 641; August 1973.

More peer-tutors attained conservation of substance than did the pupils they taught. No difference was found between taught and untaught pupils. (grades 1, 2)

Rivera, Carmen Elena. Academic Achievement, Bicultural Attitudes and Self-Concepts of Pupils in Bilingual and Non-Bilingual Programs. (Fordham University, 1973.) DAI 34A: 2238-2239; November 1973.

Time devoted to study of a second language did not affect the mathematics achievement of non-Hispanic pupils, while it aided the Hispanic group. (grades 3, 5)

Robbins, Janet Gehring. Mathematics Achievement and Attitude Toward Mathematics as a Function of Verbal Positive Reinforcement and Verbal Plus Physical Positive Reinforcement. (The University of Mississippi, 1972.) DAI 33A: 3404; January 1973.

Only on subtraction subtests were significant differences found between groups given verbal, verbal plus physical, or regular reinforcement; verbal reinforcement was favored. (grade 3)

Robinson, Mary L. An Investigation of Problem Solving Behavior and Cognitive and Affective Characteristics of Good and Poor Problem Solvers in Sixth Grade Mathematics. (State University of New York at Buffalo, 1973.) DAI 33A: 5620; April 1973.

Good problem-solvers had significantly higher scores on IQ, reading comprehension, arithmetic concepts and problem-solving, and self-esteem measures, and were less test-anxious. More impulsive pupils were poor problem-solvers, while more reflective pupils were good problem-solvers. (grade 6)

Rohr, Judith Ann Green. The Relationship of the Ability to Conserve on Piagetian Tasks to Achievement in Mathematics. (The University of Tennessee, 1973.) DAI 34A: 2398; November 1973.

Conservers of area and volume scored significantly higher than non-conservers on a standardized test; no differences were found for conservation of number and mass. (grade 3)

Rollins, Tony James. The Use of Applications in Teaching Secondary School Mathematics with Emphasis on the Situation-Model-Theory Approach. (University of Kansas, 1973.) DAI 34A: 3181-3182; December 1973.

No significant differences were found between groups taught with an applications approach or "traditionally". The role of applications in secondary school mathematics is discussed. (elementary pre-service; secondary)

Ropes, George Hardcastle. The Effects of a Mathematics Laboratory on Elementary School Students. (Columbia University, 1972.) DAI 33A: 4250; February 1973.

No significant differences in problem-solving skills or achievement were found between laboratory and non-laboratory groups. (grades 2, 6)

Rowland, Jane Mayers. Relations Between Children's Developmental Level in Performing Piagetian Angle Tasks and Achievement in Learning Angle Measure, in Upper Elementary Grades. (University of Houston, 1972.) DAI 34A: 125; July 1973.

Positive correlations were found between pupils' achievement in angle measure and ranks on three Piagetian angle tasks. (grades 4-6)

Ruby, Larry Lee. Multivariate Analysis of Achievement and Adjustment Data of Mobile Elementary School Children. (University of Illinois at Urbana-Champaign, 1972.) DAI 34A: 624; August 1973.

School mobility was found to be related to lowered scores on arithmetic and reading performance, as well as four adjustment variables, if four or more schools had been attended. (grades 5, 6)

Rudisill, Edwin Murray, Jr. An Investigation of the Relationships Between Mathematics Teachers' Personality Characteristics, as Measured by the Myers-Briggs Type Indicator, and Their Preferences for Certain Teaching Strategies. (The University of Florida, 1972.) DAI 34A: 176; July 1973.

Differences were found between the ways teachers of differing personality types reacted to four teaching strategies. (secondary pre- and in-service)

Runion, Garth Eugene. The Development of Selected Initiating Activities in the Teaching of Mathematics. (University of Illinois at Urbana-Champaign, 1972.) DAI 34A: 653; August 1973.

Twenty video-tape clips and accompanying lesson materials were developed to illustrate seven ways in which teachers might begin lessons. Evaluation with students is reported. (secondary pre-service)

Russell, A. Eugene. Developing and Validating Learning Hierarchies in Non-Metric Geometry in Preservice Elementary School Mathematics Methods Courses. (Southern Illinois University, 1972.) DAI 33A: 4808-4809; March 1973.

Two hierarchies were found to be valid for teaching ideas about one- and two-dimensional figures. (elementary pre-service)

Ryoti, Don Eino. Student Responses to Equivalent Inference Schemes in Class and Conditional Logic. (University of Illinois at Urbana-Champaign, 1972.) DAI 34A: 624; August 1973.

For fourth graders, differences between mean scores on the class and conditional logic items were not significant, but some inference schemes were significantly different at both fourth- and ninth-grade levels. (grades 4, 9)

Safransky, Robert James. A Comparison of the Retention Rate, the Scholastic Achievement and Self Concepts of Pupils in a Comprehensive Junior High School and Pupils in Control Junior High Schools. (The Florida State University, 1972.) DAI 33A: 5481-5482; April 1973.

Students in the control schools scored significantly higher on mathematics tests in grades 7 and 9 than did students in the comprehensive school. (grades 7-9)

Salzberg, Charles L. The Effect of a Free Time Contingency on the Rate of Math Progress in an Elementary "Free" School. (University of Kansas, 1972.) DAI 33B: 5550; May 1973.

Most pupils increased their rate of progress when free time was contingent on that rate. (elementary)

Sanders, Violet Alexandra. Arithmetic Problem Solving Strategies of Fourth Grade Children. (Wayne State University, 1972.) DAI 33A: 5983-5984; May 1973.

The most widely used strategy was Logical Analysis. Creative Thinking was most successful but was seldom used. (grade 4)

Schenck, Betsy Roberts. Teaching Correlates of Number Conservation to Very Young Children. (University of North Carolina at Greensboro, 1973.) DAI 33B: 4550-4551; March 1973.

Two 15-minute lessons were not effective in teaching conservation of number. (ages 3-6)

Schloff, Charles E. An Exploratory Study of Teachers' Application of Inductive Approaches in Developing an Awareness of Geometry with Fifth and Sixth Grade Children. (Wayne State University, 1972.) DAI 33A: 6076-6077; May 1973.

Pupils whose teachers attended three in-service seminars learned the geometric ideas studied. (teachers in grades 5, 6)

Schrader, Barbara H. Function and Group as Unifying Themes in Secondary School Algebra. (State University of New York at Albany, 1972.) DAI 34A: 1067-1068; September 1973.

Task analysis was applied to eleven algebra tasks, using two treatments of algebra, and definitions of five organizational goals were applied. (grade 9)

Shakrani, Mosen Sharif. A Formative Evaluation of the Mathematics Component of an Experimental Elementary Teacher Education Program at Michigan State University. (Michigan State University, 1973.) DAI 34A: 3223; December 1973.

The activity-oriented integrated content-methods course concurrent with clinical experience had a significant positive effect on achievement and attitudes. (elementary pre-service)

Shea, Robert Albert. A Study of the Effects of Contingencies of Reinforcement on Academic Behavior of Elementary School Children in a Regular Classroom. (Washington State University, 1973.) DAI 34B: 2953; December 1973.

Three experiments were reported in which varied rates of reinforcement were used on mathematics worksheets. A fixed ratio of seven with a bonus contingency appeared effective in terms of rate and accuracy. (elementary)

Sherzer, Laurence. Effects of Different Methods of Integer Addition Instruction on Elementary School Students of Different Grade and Aptitude Levels. (University of Miami, 1973.) DAI 34A: 2465; November 1973.

The "correspondence" method was more effective in all grades than the "number line" method. (grades 3-6)

Shirk, George Bernard. An Examination of Conceptual Frameworks of Beginning Mathematics Teachers. (University of Illinois at Urbana-Champaign, 1973.) DAI 34A: 653-654; August 1973.

From their oral and written reactions and observations of their teaching, the conceptual frameworks of four student teachers were analyzed. (secondary pre-service)

Shumaker, James E. A Comparison of Study Habits, Study Attitudes, and Academic Achievement in Mathematics in Junior High School of Students Taught by Individually Prescribed Instruction and Students Taught by Traditional Methods of Instruction in Elementary School. (University of Pittsburgh, 1972.) DAI 33A: 6657; June 1973.

No significant differences in mathematics achievement, study habits, or study attitudes were found between students who had an IPI or a non-IPI program in elementary school. (grade 7)

Siu, Ping Kee. Relationships Between Motivational Patterns and Academic Achievement in Chinese and Puerto Rican Second- and Third-Grade Students. (Fordham University, 1972.) DAI 33A: 3407; January 1973.

Three motivational variables were significantly correlated with both reading and arithmetic performance for both cultural groups. (grades 2, 3)

Skipper, Slade Welma. A Study of the Use of Manipulative Materials as Multiple Embodiments for the Study of Numeration Systems by Prospective Elementary Teachers. (University of Missouri-Columbia, 1972.) DAI 34A: 1168-1169; September 1973.

Students taught by the lecture method scored as well or better on tests of understanding, computation, and transfer as did students taught through material-oriented units. Those taught with two or more embodiments scored as well or better than those taught with one embodiment. (elementary pre-service)

Smith, Gerald Eugene. The Relationship of Cognitive Style and Instructional Treatment in the Acquisition of Strategies for Teaching Elementary Mathematics. (The University of Texas at Austin, 1972.) DAI 33A: 3470; January 1973.

No differences were found between students taught by teacher demonstration or a self-paced module. The cognitive style of flexibility of closure was not useful as a predictor of achievement. (elementary pre-service)

Smith, William Donald. An Investigation of the Ability of Students in the Secondary School Mathematics Curriculum Improvement Study (SSMCIS) to Generalize Their Knowledge of Function Concepts to Other Stimulus Settings. (University of Maryland, 1972.) DAI 33A: 6078-6079; May 1973.

Over 85 per cent of the students who had appropriate criterion competencies could respond correctly to corresponding transfer questions on SSMCIS content. (grade 9)

Spilman, Helen W. The Use of a Single Item-Sample to Estimate Group Achievement. (The City University of New York, 1973.) DAI 34A: 177-178; July 1973.

None of the estimated means derived from mini-tests of items randomly drawn from a standardized arithmetic achievement test were within one standard error of measurement of the total test means. (grade 2)

Stahl, Dona Kofod. Relationships Between Piaget-Based Criterion Tasks and First Grade Arithmetic Achievement. (The University of Rochester, 1973.) DAI 34A: 2181; November 1973.

Using performance on Piagetian-based tasks as predictors of success in beginning addition and subtraction achievement was not supported. (grade 1)

Stam, Priscilla Joanne. The Effect of Sociometric Grouping on Task Performance in the Elementary Classroom. (Stanford University, 1973.) DAI 34A: 3244; December 1973.

On a convergent-thinking task (arithmetic problem solving), sociometric groups performed as well as randomly formed groups. (grade 5)

Stiglmeier, Lois Mireault. Teachers' Judgments of Pupils' Dependence/Self-Reliance Characteristics Mode of Instruction and Their Relationship to Achievement. (State University of New York at Albany, 1972.) DAI 34A: 1008; September 1973.

No significant relationship was found between teachers' judgment of student needs and mode of instruction received by the student in an individually diagnosed and prescribed mathematics program, nor was there any significant difference in the achievement of pupils who were matched or mismatched (in terms of judged personality) with instructional mode. (grade 8)

Story, Garth Elias, Jr. An Analysis of Relationships Between Personality Type of Mathematics Teachers (7-12), as Measured by the Myers-Briggs Type Indicator, and Selected Factors Related to Teaching. (The University of Florida, 1972.) DAI 33A: 3471; January 1973.

Mathematics teachers were found to have a personality-type distribution differing greatly from other people, including other teachers. Differences were also found between various categories of mathematics teachers. (secondary pre- and in-service)

Stowitschek, Joseph James. Validation of Minicourse 5 for Special Education. (Utah State University, 1973.) DAI 33A: 4990-4991; March 1973.

The minicourse was found to increase EMR teachers' remedial mathematics tutoring skills; higher pupil achievement resulted. (teachers of EMRs)

Strahler, Violet Ruth. Relationship of Eight Predictive Factors to Success in Ninth Grade Science and Mathematics. (Indiana University, 1972.) DAI 33A: 4970; March 1973.

Only 29 per cent of the variability of students on mathematics measures was accounted for by the factors studied. (grade 9)

Strand, Richard Henry. Attitudes of Teachers and College Professors Toward Goals and the Elementary Mathematics Program in California. (University of Southern California, 1973.) DAI 33A: 4813; March 1973.

The developed instrument was found to have validity in distinguishing teacher attitudes toward goals and textbooks. (elementary in-service)

Swanson, Richard Alan. The Development and Evaluation of an Instructional Unit in Consumer Mathematics for Secondary School Low Achievers. (The Ohio State University, 1972.) DAI 33A: 6080; May 1973.

A unit on insurance was as effective when slides were used as when they were not used. (grades 10-12)

Taloumis, Thalia. The Relationship of Area Conservation to Area Measurement as Affected by Sequence of Presentation of Piagetian Area Tasks to Boys and Girls in Grades One Through Three. (New York University, 1973.) DAI 34B: 775-776; August 1973.

Sequencing of the area tasks affected scores on tasks presented second in the sequence. (grades 1-3)

Talton, Carolyn Flanagan. An Investigation of Selected Mental, Mathematical, Reading, and Personality Assessments as Predictors of High Achievers in Sixth Grade Mathematical Verbal Problem Solving. (Northwestern State University of Louisiana, 1973.) DAI 34A: 1008-1009; September 1973.

Factors which could be used to classify high and low achievers in problem solving with up to 95 per cent accuracy were identified. (grade 6)

Thompson, Jack Smith. Longitudinal Study of Student Self-Concept and Academic Achievement. (Utah State University, 1972.) DAI 33A: 4767-4768; March 1973.

No significant differences in arithmetic test scores were found between pupils having traditional or team-teaching in grades 4-6. (grades 4-9)

Todd, Howell Wayne. Moves and Strategies in a Skill Venture in Secondary School Mathematics. (University of Illinois at Urbana-Champaign, 1972.) DAI 34A: 654-655; August 1973.

"Skill ventures" were analyzed and moves and strategies of observed teachers categorized. (secondary in-service)

Toussaint, Nelly Adelina. Automaton and Competence Aspects of Piagetian Logical Concepts. (The University of British Columbia (Canada), 1972.) DAI 34B: 864; August 1973.

Attainment on automaton variables and logical tasks were found to be related; overall findings support Piaget's theoretical conceptions. (grades 1, 2)

Trask, Marvin Wellington. A Study on Interaction Between Aptitudes and Concrete vs. Symbolic Teaching Methods as Presented to Third-Grade Students in Multiplication and Division. (The University of Oklahoma, 1972.) DAI 33A: 4253-4254; February 1973.

No significant differences in achievement were found between a class taught with manipulative materials and one taught by textbook-blackboard-flashcards. Pupils of above-average ability in computation were aided by manipulative materials, while those of below-average ability benefited more from the symbolic method. (grade 3)

Tremblay, Clifford William. A Study of the Development of a Unit in Motion Geometry for Junior High School. (University of Illinois at Urbana-Champaign, 1972.) DAI 33A: 5483; April 1973.

The unit on transformational geometry was found to teach satisfactorily. (junior high)

Tupesis, Janis Arvaldis. Mathematics Learning as a Consequence of the Learner's Involvement in Interactive Problem-Solving Tasks. (The University of Wisconsin, 1972.) DAI 34A: 126-127; July 1973.

No significant differences between homework and no-homework groups were found in attitude, reading, retention, questioning, or geometry achievement scores. (grade 10)

Turek, Stephen. Application of the Multiembodiment Principle in a Mathematics Methods Course for Preservice Elementary School Teachers. (University of Missouri-Columbia, 1972.) DAI 33A: 5022-5023; March 1973.

A significant difference in achievement favoring the group having a course using the Dienes multiembodiment approach was found. (elementary pre-service)

Turner, James Stanley. The Spontaneous Oral Questions of Elementary School Children. (The University of Alabama, 1972.) DAI 33A: 5023; March 1973.

Over 1300 questions asked in arithmetic, reading, and social studies lessons were classified. Boys asked more questions than girls did, and older children asked more questions than younger children did. Overall, arithmetic pupils asked more questions about procedure than content. (grades 1-6)

Urbach, Donald Edward. A Comparison of Two Approaches and the Formalization of the Generalization of Formulas for Area Measure in Grade Five. (The University of Michigan, 1972.) DAI 33A: 5991; May 1973.

The "conventional" approach was better than the "sweep" approach. The non-verbal approach was better than the verbal. (grade 5)

Van de Walle, John Arthur. Attitudes and Perceptions of Elementary Mathematics Possessed by Third and Sixth Grade Teachers as Related to Student Attitude and Achievement in Mathematics. (The Ohio State University, 1972.) DAI 33A: 4254-4255; February 1973.

At third grade level, teachers' informal perceptions of mathematics and positive attitudes were associated with student comprehension; informal perceptions and negative attitudes were associated with student computation ability. No significant differences were found in grade 6. (teachers in grades 3, 6)

Vermaelen, Cherie Johnston. A Study of Changes in Semantic Meanings of Selected Concepts of High School Students Participating in Mathematics, Sciences, and Languages on a Pass-Fail Basis. (Northwestern State University of Louisiana, 1973.) DAI 34A: 1010; September 1973.

Participation in mathematics, science, and lagnuage courses on a pass-fail basis was ineffective in eliciting more positive attitudes concerning self, teacher, learning, and the subject. (secondary)

Vos, Kenneth Eugene. A Comparison Study of the Effects of Three Instructional Strategies on Problem Solving Behaviors. (University of Minnesota, 1973.) DAI 34A: 2283; November 1973.

No significant differences in problem solving achievement were found on standardized tests between pupils given a list of behaviors, behavior instruction, or problems-only. Differences were found between some groups on experimenter-constructed tests. (grades 9-11)

Walek, Bruce Peter. A Study of the Relationship Between Conceptual Tempo and Problem-Solving Abilities of Fourth-Grade Children. (The University of Florida, 1972.) DAI 34A: 215-216; July 1973.

Reflective pupils were significantly better than impulsive pupils at selecting the correct operation to solve a problem; differences on the estimation test were not significant. (grade 4)

Wall, Curtiss Edwin. A Study of the Efficacy of a Graduate Mathematics Methods Course in Changing In-Service Elementary Teachers' Attitudes Towards School Mathematics. (Michigan State University, 1972.) DAI 33A: 6210; May 1973.

A significant positive change in attitude was found after a methods course using activity materials; no change in understanding was found. (elementary in-service)

Walters, Ada Jane. A Comparison of Pupil Achievement and College Success in Two High School Programs: One Modular and One Traditional. (Duke University, 1972.) DAI 33A: 4771; March 1973.

No significant differences in mathematics were found between students having modular or traditional scheduling. (grades 10, 12, college)

Ward, William Franklin. The Development and Evaluation of a Unit on Sequential Continuity for Advanced High-School Students. (The Florida State University, 1972.) DAI 33B: 3798; February 1973.

Twelfth graders achieved as well on the developed unit on functions as did college students. (grade 12, college)

Warner, Joan Marie Reffeitt. The Effects of Two Treatment Modes Upon Children Diagnosed as Having Learning Disabilities. (University of Illinois at Urbana-Champaign, 1973.) DAI 34A: 1142-1143; September 1973.

Remediation did not result in a significant gain in arithmetic achievement scores. (grades 3-5)

Weeks, Ruth T. The Relationship of Grade, Sex, Socio-Economic Status, Scholastic Aptitude, and School Achievement to Formal Operations Attainment in a Group of Junior High School Students. (Kent State University, 1973.) DAI 34A: 2405; November 1973.

Scores of seventh- and ninth-graders differed significantly on measures of formal operations. Some sex differences were found. (grades 7-9)

Weinstein, Marian Sue. An Investigation of Algorithm Justification in Elementary School Mathematics. (The University of British Columbia (Canada), 1973.) DAI 34A: 3045; December 1973.

No significant achievement differences were found between pupils taught fraction algorithms by a strictly pattern or a strictly algebraic approach. Some evidence was found that teaching an algebraic followed by a pattern approach might be effective. (grade 5)

Weinstein, Pauline Smith. An Analysis of Methodology in the Teaching of Arithmetic Concepts as Reflected in Textbooks Used in Canadian Schools Prior to 1890. (University of Oregon, 1973.) DAI 34A: 1069-1070; September 1973.

Changes in the content and methodology of Canadian-used textbooks were noted. (elementary)

Weisman, Gale Leon. Mathematics Activity Learning Material for Prospective Elementary Teachers and a Comparative Study of Its Application. (The University of Toledo, 1972.) DAI 33A: 4255-4256; February 1973.

Attitudes became more positive in the group taught by activity learning, but no significant differences in achievement were found between that group and one taught traditionally. (elementary pre-service)

Weiss, Beverly J. Phillips. Cognitive Style and Susceptibility to Alternate Forms of Conservation Training in Kindergarten Children. (Boston University Graduate School, 1973.) DAI 34B: 1736; October 1973.

Discrimination and reversibility training were equally effective; some interaction effects were found. (ages 4-5)

Wilkinson, Arthur. An Analysis of the Effect of Instruction in Electronic Computer Programming Logic on Mathematical Reasoning Ability. (Lehigh University, 1972.) DAI 33A: 4204; February 1973.

A significant increase in mathematical reasoning scores resulted from instruction on logical flowcharting and plane geometry. (grade 10)

Williams, Ann Weber. Teaching Mathematical Verbal Problems to "Middle Ability" Sixth Grade Readers with an Inquiry Method. (The Pennsylvania State University, 1972.) DAI 34A: 1144; September 1973.

Pupils having instruction in the "inquiry" method of problem solving achieved significantly better in general reading achivement and mathematical problem solving than did pupils having "conventional" instruction. Pupils using a "formal analysis" method scored significantly better than "conventional" groups only on general reading achievement. (grade 6)

Williams, Barbara Jean Ivory. Achievement as a Function of Modifying Empirically Determined Structure of Intellect Factors Among Black Second-Grade Pupils. (University of Washington, 1973.) DAI 34A: 1721; October 1973.

No significant differences in arithmetic and vocabulary achievement were found after training on arithmetic or vocabulary related to structure-of-intellect factors. Boys scored higher than girls on the verbal measure and lower on the arithmetic measure. (grade 2)

Williams, Lucius Lee, Jr. The Effects of Independent Study During Summer Months on the Mathematics Achievement of Disadvantaged Fifth Graders. (Columbia University, 1972.) DAI 33A: 4211; February 1973.

Independent summer study of arithmetic resulted in higher achievement on fall tests. (grade 5)

Williams, Willie Elbert. A Study of a Process to Modify Verbal Interaction Patterns of High School Geometry Teachers. (Michigan State University, 1972.) DAI 33A: 6228-6229; May 1973.

"Direct" teachers became more "indirect" using observation analysis procedures. (teachers in grades 9-12)

Willis, Eva Harrell. "Sesame Street" Viewing in Early Childhood in Relation to Readiness Skills and Achievement as Measured by Standardized Tests. (University of Northern Colorado, 1973.) DAI 34B: 2293; November 1973.

First graders who had viewed 'Sesame Street' "lots" scored significantly higher on knowledge of numbers but not on knowledge of geometric shapes than did pupils who had viewed it "little". No differences were observed on either knowledge of numbers or geometric shapes between "lots" and "little" viewers at the kindergarten level. (kindergarten-grade 2)

Wilson, John Martin, Jr. Post Mathematical Attitudes Among Prospective Elementary Teachers as Predicted by General Mathematics Skills, Modern Mathematics Skills, Modern Mathematics Achievement, and Prior Mathematical Attitudes. (Northern Illinois University, 1973.) DAI 34A: 2453; November 1973.

A significant positive relationship was found between "postmathematical" attitudes and each of the other factors studied. The measures of modern mathematics skills and achievement and of prior attitudes contributed most to prediction of attitudes. (elementary pre-service)

Wolfe, Marshall. Attitudinal Factors Relating to the Acceptance of Educational Accountability. (Western Michigan University, 1973.) DAI 34A: 655; August 1973.

Teachers felt that the primary area in which the school system should be held accountable is mathematics skills. (elementary in-service)

Wood, Stillman Wayne. A Study of Selected Student, Instructional, and Achievement Variables Within a Program of Individually Prescribed Instruction in Mathematics for Junior High Educable Retardates. (University of Oregon, 1972.) DAI 33A: 6760-6761; June 1973.

No achievement differences were found between IPI and non-IPI groups of EMRs on norm-referenced tests; differences favored the IPI group on four of 12 criterion-referenced tests. (grades 7-9, EMRs)

Woods, Francis Pollard. A Study of Mathematics Education in the Public Secondary Schools of Louisiana. (The Louisiana State University and Agricultural and Mechanical College, 1972.) DAI 33A: 6604-6605; June 1973.

Characteristics of teachers and programs were cited. (secondary in-service)

Wunderlich, Kenneth Waldie. The Effects of Questions of Differing Cognitive Levels Interspersed in Mathematics Text Material. (The University of Texas at Austin, 1972.) DAI 33A: 4820; March 1973.

No differences were found between groups who read a passage with questions of differing cognitive levels inserted. (grade 10)

Yawin, Robert Arthur. The Effects of an Independent Study Program Upon Selected High School Students' Attitudes Toward High School, School Subjects, and Classroom Procedures. (The University of Connecticut, 1972.) DAI 33A: 5484; April 1973.

The attitudes toward mathematics of the independent study group became slightly more unfavorable, while students in the control group evidenced a "very large" unfavorable change in attitudes toward mathematics. (secondary)

Yens, David Peter. The Interaction Between Reward Preference and Task Difficulty in a Computer Assisted Instruction Setting. (The Pennsylvania State University, 1972.) DAI 33A: 6742-6743; June 1973.

Few significant differences were found in this study on the effect of three rewards: marks, public recognition, or candy. (elementary)

Zander, Betty Jo Jackson. Junior High Students View Themselves as Learners: A Comparison Among Eighth Grade Students. (University of Minnesota, 1973.) DAI 34A: 2254-2255; November 1973.

No significant differences in self-concept were found between groups taught by a team or non-team approach. Two of three self-concept scores were significantly related to a mathematics test score. (grade 8)

Ziegenfuss, Penny Low. Development and Training of Time Concepts in Young Children. (The Pennsylvania State University, 1972.) DAI 33A: 5420-5421; April 1973.

Both age and social class differences were found in the development of time concepts. Training improved achievement of kindergarten children. (ages 3-8)

Zoet, Charles Jay. The Effect of Increased Attention to Exponents on the Acquisition of Logarithmic Concepts and Skills in Algebra II. (The University of Michigan, 1972.) DAI 33A: 6081; May 1973.

The groups which spent twice as much time on introductory work achieved better in the unit on exponents and logarithms. (grade 11)

Journals Cited in 1973 Research Listing

	Level			
	Elem.	Sec.	Both	Total
American Educational Research Journal	3	1		4
Arithmetic Teacher	5		1	6
AV Communication Review		1		1
California Journal of Educational Research		1		1
Child Development	8			8
Contemporary Education		1		1
Educational and Psychological Measurement		1		1
Exceptional Children			1	1
Journal of Educational Measurement		1		1
Journal of Educational Psychology		3		3
Journal of Educational Research		2		2
Journal of Experimental Child Psychology	2		1	3
Journal of [illegible]netic Psychology	2	1		3
Journal for Research in Mathematics Ed.	17	5	2	24
Journal of Social Psychology	1		1	2
Mathematics Teacher		2	1	3
Psychological Reports	3			3
Psychology in the Schools	1			1
School Science and Mathematics	6	1	1	8
	48	20	8	76

Universities Cited on 1973 Dissertation Listing

	Level			
	Elem.	Sec.	Both	Total
American University		2		2
Arizona State University		2	1	3
Auburn University	1	2		3
Boston College	1			1
Boston University School of Education	2	1		3
Catholic University of America	1			1
City University of New York	1			1
Claremont Graduate School	1			1
Columbia University	10	7	1	18
Cornell University	1			1
Duke University	3	1		4
East Texas State University	1			1
Florida State University	3	3		6
Fordham University	3	1	1	5
George Washington University		1		1
Illinois Institute of Technology	1			1
Indiana University	5	3		8
Iowa State University			1	1
Kansas State University		1		1
Kent State University	1	1		2
Lehigh University		1		1
Louisiana State University and A & M Col.		1		1
Loyola University of Chicago	1			1
McNeese State University	4			4
Michigan State University	6	2		8
Mississippi State University		1		1
New York University	3			3
Northern Illinois University	3	1		4
North Texas State University	1		1	2
Northwestern State University of Louisiana	1	1		2
Northwestern University	3		2	5
Ohio State University	1	3	1	5
Oklahoma State University	1			1
Oregon State University	1			1
Pennsylvania State University	7	1		8
Purdue University		1	1	2
Southern Illinois University	1	1		2
Stanford University	1	1	1	3

	Elem.	Sec.	Both	Total
State University of New York at Albany		2		2
State University of New York at Buffalo	2	1	2	5
Syracuse University	7			7
University of Alabama	2			2
British Columbia	2			2
California at Los Angeles	4			4
Cincinnati		1		1
Connecticut	1	3		4
Florida	1	3		4
Georgia	4	5	1	10
Houston	3	1	1	5
Illinois at Urbana-Champaign	4	7	1	12
Iowa	1	2		3
Kansas	3		1	4
Maryland	1	3		4
Massachusetts	1		1	2
Miami	2			2
Michigan	2	3		5
Minnesota	1	4		5
Mississippi	2			2
Missouri-Columbia	2	1		3
Missouri-Kansas City		1		1
Montana		1		1
Nebraska		2		2
New Mexico	2			2
North Carolina at Greensboro	1			1
North Dakota	1		1	2
Northern Colorado	9		2	11
Oklahoma	3			3
Oregon	4	4		8
Pennsylvania	1			1
Pittsburgh	4	2		6
Rochester	1	2		3
Southern California	3	2		5
Tennessee	3	1		4
Texas at Austin	5	4		9
Toledo	2			2
Toronto	1			1
Tulsa			1	1
Utah	1			1
Virginia		2		2
Washington	2			2
Wisconsin	3	3		6

	Elem.	Sec.	Both	Total
Utah State University	4	1		5
Washington State University	1			1
Wayne State University	7	1		8
Western Michigan University	1			1
West Virginia University	2			2
Yeshiva University	2			2
	177	101	21	299